

The Mining Journal

RAILWAY AND COMMERCIAL GAZETTE

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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No. 2171.—Vol. XLVII.

LONDON, SATURDAY, MARCH 31. 1877.

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JAMES H. CROFTS, STOCK AND SHARE BROKER,
AND MINING SHARE DEALER,
No. 1, FINCH LANE, CORNHILL, LONDON, E.C.
ESTABLISHED 1842.

Business transacted in all descriptions of MINING Stocks and Shares (British Foreign, Consols, Banks, Bonds (Foreign and Colonial), Railways, Miscellaneous, Insurance, Assurance, Telegraph, Shipping, Canal, Gas, Water, and Shares).

Business negotiated in Stocks and Shares not having a general market value. Business in COLLIERY and IRON Shares, and in the principal WAGON and FACTURING COMPANIES OF THE NORTH OF ENGLAND AND SCOTLAND.

Business in all the principal COTTON SPINNING Shares.

J. H. CROFTS having now established CORRESPONDING AGENCIES in all the Towns of the United Kingdom, is prepared to deal in the various LOCAL Stocks and Shares at close market prices.

Accounts opened for the Fortnightly Settlement.

Monthly and Daily Price Lists issued.

Bankers: City Bank, London; South Cornwall Bank, St. Austell.

Special Dealings in the following, or part:—

50 Derwent, £2 1/2. 50 North Laxey, 15s. 6d.
50 Don Pedro, 9s. 6d. 50 Pestana, 4s. 6d.
50 East Van, £7 1/2. 50 Parys Mountain, 9s.
50 Exchequer, £2. 50 Penrith, 11s.
50 Eberhardt, £2 1/2. 50 Prince of Wales, 5s.
50 Flagstaff, £2 1/2. 50 Richmond, £5 1/2.
50 Hingham, 13s. 6d. 50 Rookhope, 17s. 3d.
50 Glenroy, 10s. 6d. 50 Tankerville, £2 1/2.
50 Colorado, £1 1/2. 50 Van Consoles, £2 1/2.
50 Llanrwst, £2. 50 W. Tankerville, 27s. 6d.
50 Llangan, £2 1/2. 50 W. Tanker, Pref., £2 1/2.

* Shares sold for forward delivery (one, two, or three months) on deposit of 20 per cent.

FOREIGN BONDS.—ARGENTINE.—EGYPTIAN.—RUSSIAN, SPANISH, TURKISH. SPECIAL BUSINESS, and latest information.

JAMES H. CROFTS, 1, FINCH LANE, LONDON.

RAILWAYS.—SPECIAL BUSINESS. Fortnightly accounts opened on receipt of the usual cover.

JAMES H. CROFTS, 1, FINCH LANE, LONDON.

AQUARIUM, HOTEL, AND MISCELLANEOUS SHARES.—SPECIAL BUSINESS in Brighton Aquarium, Royal Westminster Aquarium, Yarmouth Aquarium, Simpson's Tavern, Chatwood's Safe, Milner's Safe, Graph Construction, Globe Preference, Royal Insurance, Positive Assurance, and Wye Canal, Earle's Shipbuilding, Queen's Hotel (Norwood), and others.

* BUSINESS TRANSACTIONS in all MISCELLANEOUS SHARES (of whatever description) having LONDON or COUNTRY MARKET VALUES.

JAMES H. CROFTS, 1, FINCH LANE, LONDON.

BRITISH LEAD SHARES.—BUSINESS in all leading Market Mines and Lutes: Special Information from the various districts.

JAMES H. CROFTS, 1, FINCH LANE, LONDON.

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10 Cardiff & Swan, £2. 20 Chapel House, £2 1/2.
10 J. H. CROFTS, 1, FINCH LANE, LONDON.

COTTON SPINNING SHARES.—BUSINESS in all OLDHAM SHARES, and in those of other DISTRICTS.

* SPECIAL BUSINESS in the following at the prices named:—

Name of Mill.	Last four dividends, per cent.	Closing quotations, March 23.	Buyers.	Sellers.
Central	20, 20, 10, 10	£ 3	£ 3 1/2	
Greenacres	20, 20, 5, 15	£ 4 1/2	£ 4 1/2	
Green Lane	20, 20, 25, 20	75 1/2	75 1/2	
Oldham Twist	32, 20, 12, 15	25	25	
Royston	30, 20, 10, 10	25 1/2	25 1/2	
Shaw	20, 10, 10, 10	25 1/2	25 1/2	
Star	20, 20, 5, 14	25 1/2	25 1/2	
Winder	20, 20, 10, 10	25 1/2	25 1/2	

Note:—Erroneous quotations having elsewhere appeared, it may be necessary to state that the above are the ACTUAL DEALING PRICES at which business can be transacted either way. The shares of good Cotton Spinning Companies pay remunerative dividends, the mills being almost entirely conducted on the Co-operative system, under the Limited Liability Acts. With a revival in trade the present rate of dividends would be augmented.

JAMES H. CROFTS, 1, FINCH LANE, LONDON.

Bankers: City Bank, London; South Cornwall Bank, St. Austell.

ESTABLISHED 1842.

M. WILLIAM H. BUMPUS,
STOCK AND SHARE BROKER,
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[Established 1847.]

SPECIAL BUSINESS, at close prices, in the SHARES of all the principal HOME and FOREIGN MINES.

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The following Lots, or any part, are FOR SALE, at prices annexed:—

50 Aberdunant, 13s. 6d. 50 Eberhardt, £3 1/2. 50 Pateley Bridge, 10s. 6d.
50 Argentine, 10s. 6d. 50 Exchequer, £2 1/2. 50 Penrith, 11s. 9d.
50 Almada, 8s. 9d. 50 Frontino, 34s. 50 Parys Mountain, 9s.
50 Birdseye, 15s. 6d. 50 Flagstaff, £2 1/2. 50 Rookhope, 15s. 3d.
50 Blue Tent, 50 Glenroy, 28s. 6d. 50 Roman Grav., £12 13s. 9d.
50 Colorado, 33s. 50 Glyn, £1 19s. 50 Richmond, £5 16s. 3d.
50 Cheateles, 8s. 50 I. X. L., 22s. 50 So. Condurow, £7 1/2.
50 Condes of Chili, £4 1/2. 50 Javal, 9s. 6d. 50 Tankerville, £2 1/2.
50 Devon Consols, £4. 50 Kapunga, £2 1/2. 50 Van, £26 1/2.
50 Derwent, £2 18s. 9d. 50 Last Chance, 13s. 6d. 50 W. Tankerville, £2 1/2.
50 Don Pedro, 10s. 50 Leadhills, £2 1/2. 50 W. Tankerville, 27s. 6d.
50 East Van, £7 1/2. 50 Marke Valley, 19s. 6d. 50 Wheel Grenville, £4 1/2.
50 East Caradon, 18s. 50 N. Quebrada, £4 1/2. 50 Wye Valley, £4 1/2.
50 North Laxey, 15s. 6d.

IMPORTANT.

To Capitalists, and all who seek SOUND and PROFITABLE INVESTMENTS, the following are confidently recommended, and they will be found worth the attention of every Investor, viz:—

ARGENTINE COMPANY (LIMITED).

CONDES COMPANY OF CHILI (LIMITED).

BLUE TENT HYDRAULIC GOLD MINES (LIMITED).

Full particulars of the Mines, and every information concerning the several Companies, may be obtained (in the form of a Circular) on application to Mr. Bumpus, who has special facilities for dealing in the shares.

RICHMOND CONSOLIDATED—EBERHARDT—FLAGSTAFF.—Investors and others interested in these companies, who may be desirous of obtaining information and advice as to operations in the shares at the present time, are requested to communicate with the undersigned.

WILLIAM HENRY BUMPUS, SWORN BROKER.

Offices: 44, Threadneedle Street, London, E.C.

Business transacted in Stock Exchange Securities and Miscellaneous shares of every description. Fortnightly accounts opened. References given and required when necessary. A Stock and Share List forwarded free on application.

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10 Aberdunant. 10 Llanrwst. 50 South Darren.
5 East Van. 20 Rookhope. 5 Wye Valley.
10 Cargill. 15 Grogwinion. 5 West Mostyn, 12 per cent. preference.
50 Combarmin. 10 Llanrwst. 5 West Wye Valley.
20 Derwent. 20 Penrith. 5 West Wye Valley.

Prices of the above on application.

APRIL SPECIAL INVESTMENT CIRCULAR.—Immediate application must be made for the above. March number quite exhausted. It is QUITE UNIQUE. Published NEXT WEEK by—

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JOSEPH JOHN PYNE,
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Mr. PYNE having been connected with MINING ENTERPRISE for upwards of FOURTEEN YEARS, and having been a DIRECTOR of MINES in SHROPSHIRE, MONTGOMERYSHIRE, CARDIGANSHIRE, CARNAVONSHIRE, YORKSHIRE, and in VENEZUELA, has had great opportunities of becoming acquainted with this particular branch of industry, and will always be desirous of giving every information in his power to all Investors transacting business with him.

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(Established 1857.)

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Almada	£ 6s. 8d.	North Laxey	15s. 6d.
Asheburton	£ 1 1/2. 1/2	New Zealand Kapanga	£ 4 1/2. 1/2
Bodidra	2 1/2	Parys Mountain	7s. 6d.
Derwent	2 1/2	Pennerley	12s. 6d.
Devon Great Consols	3 1/2	Penrith	10s.
Dolcoath	34	Penrith	11s.
Don Pedro	8s. 10s.	Richmond	5 1/2. 5 1/2
Eberhardt	8 1/2. 8 1/2	Roman Gravels	12 1/2. 12 1/2
East Caradon	8 1/2. 8 1/2	Rookhope	16s. 18s.
East Van	8 1/2. 8 1/2	Santa Barbara	2 1/2. 2 1/2
Exchequer Gold	3 1/2. 3 1/2	San Pedro	7 1/2. 7 1/2
Flagstaff	3 1/2. 3 1/2	South Condurow	7 1/2. 7 1/2
Frontino	1 1/2. 1 1/2	Tankerville	18 1/2. 19
Glenroy	1 1/2. 1 1/2	Tincoff	18 1/2. 19
Glyn	1 1/2. 1 1/2	Van	35 1/2. 37
Great Laxey	20 1/2. 21	Van Consols	2 1/2. 2 1/2
Javal	8s. 9s.	West Asheton	3 1/2. 3 1/2
Last Chance	10s. 12s. 6d.	West Chiverton	18 1/2. 19
Ladywell	1 1/2. 1 1/2	West Tankerville	1 1/2. 1 1/2
Leadhills	6 1/2. 6 1/2	Wh. Grenville	1 1/2. 1 1/2
Lisburne	65 1/2. 70	Wye Valley	4 1/2. 4 1/2
Marke Valley	15s. 17s.		

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No. 30, GREAT ST. HELEN'S, LONDON, E.C., has SPECIAL BUSINESS in St. Patrick, Wheal Whisper, Pennerley, South Tolcarne, East Lovell, East Van, Pennant, East Caradon, West Craven Moor, Lead Hills, Minera, Parys Mountain, West Godolphin, and Wheal Grenville shares.

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They have established Corresponding Agencies in all the principal towns of the United Kingdom, and are prepared to deal in the various local Stocks and Shares at close prices. Orders per post or telegraph receive prompt attention.

INVESTORS SHOULD APPLY for a copy of Messrs. W. J. TALLENTIRE and Co.'s Circular, SENT POST FREE. It contains valuable information on Foreign Stocks (especially South American, Egyptian, and Turkish), Railways, and Lead Mines.

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SPECIAL BUSINESS in the following:—

Asheton, 32s. 6d. Gawton, 5s.
Aberdunant, 13s. 6d. Hingham, 12s.
Bedford United, £2 1/2. Ladywell, 23s.
Chapel House, £2 1/2. Leadhills, £2 1/2. 3d.
Combarmin, 8s. Llanrwst, 36s. 9d.
Derwent, £2 1/2. Marke Valley, 19s. 6d.
Devon Consols, £2 1/2. North Laxey, 15s. 6d.
East Van, £7 1/2. Pateley Bridge, £2 1/2.
Grogwinion, Pennerley, 14s. 6d.
Great Laxey, £20 1/2. Penrith, 10s. 3d.
Glenroy, 25s. Pandora, 25s.
Glyn, 37s. 6d. Parys Mountain, 8s. 6d.
Almada, 7s. 6d. Eberhardt, £2 1/2.
Argentine, £4 1/2. Exchequer, 41s.
Cedar Creek, 13s. 9d. Emma, 8s. 9d.
Condes of Chili, £4 1/2. Flagstaff, £2 1/2. 3d.
Colorado, 28s. 9d. Frontino, 32s. 6d.
Chontales, 6s. 6d. I. X. L., 20s. 6d.
Don Pedro, 9s. Javal, 9s. 3d.

JAMES STOCKER, SWORN BROKER.

Consols, Foreign Bonds, Railways, Bank, Telegraph, Gas, and all miscellaneous Shares bought and sold, and fortnightly accounts opened for same. Shares sold for forward delivery on receipt of cover. List of prices and every information forwarded on application. References given and required when necessary.

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Strongly recommend the ABOVE MINE as one of the BEST and SAFEST MINING INVESTMENTS. The dividends are declared half-yearly—the one now being paid is at the rate of 20 per cent. per annum, against 12 1/2 per cent. last time. Every information upon application to the above.

WYE VALLEY AND WEST WYE VALLEY LEAD MINES.
The shares of these companies should be bought. The prospects have recently improved very much, and good discoveries have been made.

NOTICE.

BROKERS OR DEALERS HAVING SHARES FOR SALE in either GROGWINION, WYE VALLEY, or WEST WYE VALLEY MINES, can FIND IMMEDIATE PURCHASERS on application to—

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20 Argentine, £4 1/2. 50 Glyn, £1 18s. 25 Pamlico
30 Birdseye Creek, 17s. 50 Gold Run, 9s. 6d. 50 Parys Mount, 9s. 6d.
25 Bedford Unit., 12s. 6d. 50 Great West Van, 6s. 50 Penrith, 10s.
50 Chontales, 6s. 9d. 40 Hingham, 12s. 40 Rookhope, 17s.
20 Cakmore, £2 10s. 30 I. X. L., 19s. 6d. 10 Richmond, £5 18s. 9d.
20 Colorado, £1 1/2. 15 Leadhills, £2 1/2. 75 South Aurora, 6s. 6d.
20 Condes of Chili, £4 1/2. 3 Lisburne, 60s. 25 San Pedro, 15s. 6d.
20 Derwent, £2 1/2. 4 Minera, £18 1/2. 15 Santa Barbara, £1 15s.
15 Eberhardt, £2 18s. 9d. 80 Marke Valley, 20s. 6d. 15 St. Harmons, £2 13s. 9d.
40 East Caradon, 18s. 9d. 40 Nth. Laxey, 16s. 40 Van Consols, £2 1/2.
30 Frontino, £1 12s. 20 Pennant, £5 1/2. 15 W. Tankerville, £1 7s.
50 Flagstaff, £3 3s. 9d. 20 Pateley Bridge, £2 13s. 20 ditto Pref., £2 1/2.
50 Glenroy, £2 1/2. 50 Pennerley, 13s.

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15 Alamillos. 20 Frontino. 50 Port Phillip.
100 Aberdunant. 10 Great Laxey. 70 Penrith.
20 Argentine. 15 Grogwinion. 35 Pennerley.
50 Birdseye. 40 Glyn. 40 Pennant.
70 Bodidra. 20 Gold Run. 20 Richmond.
40 Chapel House. 30 Ladywell. 10 Roman Gravels.
75 Combarmin. 10 Leadhills. 40 St. Harmons.
40 Derwent. 50 North Laxey. 40 Tankerville.
75 Exchequer. 50 New Quebrada. 5 Van.
20 Eberhardt. 15 New Zealand. 40 Van Consols.
25 East Van. 40 Parys Mount. 10 W. Chiverton.
30 Flagstaff.

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Begin to notify to their clients and investors generally that Shares offered in the LLANRWST LEAD MINE at low prices, through the medium of this Journal, are rarely, if ever, delivered to the Buyer. To ensure the delivery of Shares bought, purchasers are cautioned to pay cash only on the delivery of transfers, accompanied by the holders' certificates.

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BRITISH LEAD MINES.—TO INVESTORS.

MESSRS. ENDEAN, FISHER, AND CO.'s Selected List of Lead Mines for Investment for the present year may be had, post free, on application.

Address—**ENDEAN, FISHER, AND CO., 3, LOMBARD COURT, LONDON, E.C.**

NOTICE.—We regret to find that some of our clients have been induced to PURCHASE LLANRWST SHARES, advertised in this Journal at low prices about two months ago, and up to the present time have been unable to obtain the delivery of the same. Purchasers of these shares when offered at low prices will do well to see that the transfer is certified by the Secretary of the company, or the certificate attached before they part with their money.

ENDEAN, FISHER, AND CO.,

difficulties. The common process of puddling has been established by long usage, but we should not forget that its introduction also was beset with many troubles. Referring to the invention for using phosphyne in the puddling furnace, Mr. Howson pointed out that the utility probably consists simply in this, that they assist in purifying the metal from the cinder, which is so essential in giving soundness to the hammered bloom. According to the instructions usually specified in these instructions, the proper time for adding the phosphyne seems to be towards the end of the process, and there is good reason for this, because if it were applied early it would be lost in the slag, and the greater part of which will be carried away by the puddling. It is a question whether the adoption of this method of working in the puddling furnace would not enable the excessive heat to be somewhat moderated. A few handfals of sand thrown in just at the point when the iron is ready to ball, always facilitates the shingling process, and tends to produce a solid bloom, and, always affecting the iron, so far as he is aware, injuriously. This view was confirmed by analyses made by Mr. Stead (of Pattinson and Stead) at the suggestion of Mr. Williams. A small quantity of Cleveland pig, accompanied with some of the iron, was poured in a liquid state into a hot crucible; a cover was then put on, and the whole was shaken up violently for a quarter of a minute. The crucible, and the whole was then poured into a mill tap alone, and after treatment the metal contained—carbon 2.40; silicon, a trace; and phosphorus, 0.13 per cent. In the metal contained—carbon 3.00; silicon, a trace; and phosphorus, 0.04; showing that in the puddling furnace, where the real difficulty lies, the best result was obtained. It may here be noted that the wonderful shortening of the puddling process, which was effected from pig containing not less than 1.25 per cent. of phosphorus, is an essential of effective puddling. Hence it is again a question, not less than a substitute for, and tend so far to moderate, the excessive and to some extent, the machine puddling in the revolving furnace has during the last few years been on its trial, and has had a hard struggle for the mastery to which it is still destined to attain.

Mr. HEAD said that exception had been taken to his observation at Leeds, that he thought the phosphorus in Cleveland pig had somewhat increased. Formerly good Cleveland forge pig did not run above 1.4 per cent. for phosphorus, whilst now it nearly had 1.5 per cent. One of the most remarkable things to him was that iron containing so much as even an average of 1.689 per cent. of phosphorus, or very nearly 1.5, should work well without complaint; but as far as he could see, unless there was any error in his calculations, he thought it seemed to be established that Cleveland iron sold by merchants as good brands did often contain 1.5 per cent. of phosphorus. He would say that if Mr. Bell still thought he was wrong he hoped he would show him in what particular. Referring to the conclusion of Mr. Kirk's paper, in which he stated that he believed phosphorus acted in the puddling-furnace in a similar way to silicon in securing the fettling, he thought he had a little misunderstood him there. He (Mr. Head) did not mean to say that; all he meant to say was that when foremasters were afflicted with bad lots of pig-iron it was not always the silicon that was to be blamed, because, on analysis, they might find that the silicon was low in the pig-iron, but in such cases they would find that the phosphorus was excessive. The evil he complained of was one which caused great loss to foremasters, for not only did the pig-iron give a bad yield, but it had a bad effect on the bottom of the furnace. During the last six months much weak iron came in, and he had, therefore, had four samples of the bad working and three samples of well working iron analysed. He would give the figures of the silicon and phosphorus only, as these were the only materials that much differed. In the bad working pig the silicon found was 2.575, 3.158, 2.286, giving an average of 2.461, or roughly 2.5 per cent., whilst the phosphorus was 1.67, 1.8, 1.727, and 2.28, giving an average of 1.869, or more than 1.8 per cent. In the well working pig the silicon found was—2.008, 1.520, and 0.914, giving an average of 1.48, or roughly 1.5 per cent., whilst the phosphorus was 1.068, 1.727, and 1.672, giving an average of 1.689, or something under 1.7 per cent. Therefore, in the phosphorus the difference was nearly 0.2 per cent. The analyses were made by Mr. Thompson, and as he at first thought that the difference might be from the mode of estimation, he had samples sent to Riley, and to Pattinson and Stead. The phosphorus was returned by Riley at 1.6, by Pattinson and Stead at 1.62, and by Thompson at 1.668, being practically the same.

Mr. BROGDEN enquired whether Mr. Head had estimated the sulphur at the same time?—Mr. HEAD attributed the blame to the phosphorus, for they found in the bad pig—sulphur 0.248, and in the good 0.227, which was practically the same.

Mr. RILEY would refer to the relation of silicon, carbon, and sulphur in pig-iron generally. He thought, before coming to any conclusion as to the analyses of Mr. Head had put before them, they ought to look at the relation between those three elements. They would always find that if they had a high percentage of carbon the sulphur and phosphorus went down. Mr. Bell started a theory some time ago that it makes little difference as to the normal impurities, but that it was merely a matter of temperature, and that by increasing the temperature in white iron he obtained grey iron. He was, of course, referring to iron free from manganese. Spiegel-eisen they sometimes found absolutely free from carbon, and they also found that as the silicon went up the carbon went down. He believed that in some cases the carbon was burnt out before they could get rid of the phosphorus, and it might be that in getting the phosphorus out of the Cleveland pig you burnt the nature out; but generally it did seem that simply keeping the carbon in the iron enables you to get the other deleterious ingredients out. He had shown with silicide of iron you could have 20 per cent. of silicon and no carbon. As to sulphur and carbon there is a similar effort, one to drive out the other. With excess of carbon and high temperature he got iron without sulphur, and he believed that in comparing the quality of pig-iron the carbon should be estimated.

Mr. BAKER, of Sheffield, said that as to the elimination of impurities he would mention some experiments which would be interesting. It was attempted to remove impurities in an atmosphere other than air. Starting from Schaffheit's process he found that there was a difference in the elimination of impurities when clay and graphite pots were used. He operated upon the charges of 3 lbs. of iron, and passed chlorine through for an hour, and the loss was about 0.5 per cent. in the melting. In the graphite pot the elimination of phosphorus was from 0.8, and it was reduced to 0.3; with the clay pot there was no elimination of phosphorus, but the carbon was, of course, increased. He thus found that in the chlorine atmosphere phosphorus was eliminated, but not without the presence of carbon.

Dr. PERCY had brought down a lively specimen of a "bear," obtained in one of the furnaces of Mr. Attwood, with the analysis of it. After working the blast-furnace for a long period (of course, they all knew this) a mass of metal called the "bear" collected. In order to melt out this hot blast was increased, and coke charged in with a small quantity of lime, no ore, and the portion of the metal melted ran out. The specimen was a portion of that last run out, about 1 ton in weight. The interesting point about it was that it contained not less than 15.378 of silicon; that was the largest amount he had met with in any product of that nature, but the carbon was small, under 1 per cent., the figures being—carbon, 0.787; phosphorus, 1.13; manganese, 3.425; copper, 0.483; nickel and cobalt, traces, and a little lime, magnesia, and alumina. He was disposed to fancy that arsenic would be found more commonly in many of their iron ores than had been supposed. They knew little indeed about the effect of arsenic upon bar-iron. There were a very few facts recorded. He had brought down a specimen of a piece of Cumberland hematite supplied to him some years ago by Mr. Mushet, which he had kept heated to redness for a long time in common charcoal, whereby that piece of ore had been reduced entirely, even to the cinder, to the metallic state, and being curious to see how it would work under the hammer he took it down to the Houses of Parliament, where they had a very accomplished smith, and asked him to forge a specimen, which he did, and to his astonishment the small of arsenic was exceedingly strong, and filled the whole place directly. Then came the question whether it might not be desirable to investigate the presence of arsenic in ores of that nature, and he had no doubt there were many gentlemen there who were perfectly competent to undertake that task, and in the hope of inducing them to make enquiry on the subject he had ventured to trouble them with these few remarks. The whole subject was one which required careful working out.

Mr. RILEY had found arsenic in a sample of Cumberland hematite. He made steel from it, which when worked smelted distinctly of arsenic, the steel being very brittle and useless, and he must say that he had been lately engaged in examining that which should

contain arsenic, a series of blue billy or purple ore. He had very carefully examined it for arsenic, and in a very few samples could he detect any appreciable quantity, though he had taken the most accurate means for determining it, and he must say that his experience would not lead him to suppose that they had arsenic in many of their ores, and he had tested them very carefully; and in regard to carbon in iron, iron seemed to have the property at a high temperature of dissolving far more than 4.5 per cent., and as it cooled it crystallised, and if it was cooled very slowly there were large plates of graphite between the crystals of iron, and he had seen analyses giving 7 per cent. of carbon, which was simply due to plates of graphite between the crystals and the iron, and formed no part of the iron whatever. He believed that about 4.5 per cent. was the maximum quantity of carbon that they could put into iron when there was no manganese present.

Mr. G. J. SNELES said that when he mentioned at Leeds that the Commissioners' statement as to the Danks puddling was correct he referred to the weighings in at Cincinnati, not that the analyses were absolutely correct. In the limited time at their disposal it was impossible to do more than they had done, and he could only give the analyses of each class of pig-iron as nearly as they could get it from the samples they obtained. They could not weigh the squeezer cinder, and all their samples had to be analysed after their return from America and before the May meeting. It was impossible for him to know exactly the percentage of phosphorus in the pig-iron. He thought that now it would be better to expend time in getting fresh results than in investigating old ones.

Mr. J. A. JONES (of Middlesborough) would also justify the Commissioners' statement, and could not understand Mr. Kirk's statement respecting it; he thought his paper resolved itself into the question—Did they use more fettling per ton of iron produced than they accounted for? and pointed out that he had fallen into error in treating the Commissioners as stating that 18 cwts. 2 qrs. 25 lbs. cold pig-iron produced a ton of puddled bar, with 5.5 cwts. of fettling. The Commissioners were instructed to enquire whether the furnace would puddle at all, and whether there was anything special in the quality of the iron used. This they did. As to more recent results, he would give them those obtained at the Erismur Works. The fuel used previously to June, 1874, was 27.65 cwts. per ton of puddled iron. From that date to November, 1875, the consumption was 18.30 cwts. per ton of bars rolled, and this was further reduced to 16.91 cwts. during the last month they were at work. In No. 10 furnace the fuel used was 13.90 cwts. per ton of bars rolled, and the fettling—12 cwts.—was subsequently reduced to 8.48 and 7.006 respectively. These figures showed that they were progressing. The wages were reduced to the extent of from 11s. to 15s. per ton of puddled bars. During the last month they worked 21 tons 18 cwts., and he still believed, from the experience he had had with it, that rotary puddling would be very successful. Of course, there were many difficulties yet to be overcome, but he was glad to know that Mr. Heath had been quite satisfied with the adoption of the rotary furnace, and that, so far as he was concerned, it had been a source of profit to him; and he thought also that the results of Hopkins, Gilkes, and Co. would show that rotary puddling could be looked upon as having improved very considerably in the last two or three years.

Mr. INNES HOPKINS stated that the Danks furnace was satisfactory with regard to phosphorus, and he believed that in it the phosphorus could be almost entirely eliminated; after it leaves the furnace no phosphorus is eliminated. He should mention that much of the late improvement in the Danks was due to the men. They were now rendering their assistance to make it a success. They considered they had now gone beyond the range of experiment, and they knew they could now make as good a rail or as good a bar as by hand puddling. They were now, practically working, turning out 200 tons per week, or 4 tons per shift per furnace, and during the last few weeks with seven furnaces they made 290 tons per week.

Mr. W. FARNWORTH came to the assistance of iron as against soft steel. He believed that welding did not depend upon silica but on other reasons. He believed the grains of iron came one into the other in the weld. As to the effect of arsenic he recollected meeting with an iron that worked well in the mill, but could be done nothing with in the blacksmith's shop, and upon enquiry he found that in the blast-furnace Irish bog ore rich in arsenic had been used.

Mr. MAYNARD had had some experience about 20 years ago at the works of Brydon and Sons, in the use of Champlain magnetite in the puddling furnace. These contained from 1.5 to 1.7 per cent. of phosphoric acid. The ordinary working charge was 50 per cent. of magnetite and 50 per cent. of brown hematite, and the quantity of phosphorus was about the same in each. In the tap cinder there was about 4 per cent. of phosphorus, yet the iron is one of the best that goes into the market. The use of ore for fettling is not new, and in America hot-blast up to 400° is used in the puddling furnace.

Mr. PRICE considered iron in the puddled bar in a better condition for welding than at any subsequent point. The evidence furnished by Mr. Howson as to the cinder in the centre of the puddled bloom was not borne out by his experience. They found no advantage from frequent cutting, piling, and re-heating. After the first two pilings they found that piling promoted weakness, and welding was not to be depended upon.

Mr. CRAMPTON would like to see the merits of the rotary furnace ascertained, and also the effect of charges of different sizes. As to welding, he believed there was no weld that would give more than half the normal strength. He believed the iron must be made in large masses, and must be rolled in large blooms. He showed a common tube, one portion of which had been heated and quenched suddenly and turned over cold, and the other portion drawn cold and turned over. What he urged was that the Danks furnace would eliminate enough phosphorus to adapt the product for the manufacture of good iron. He believed that if iron was to compete with steel you must abandon the laminating process.

Mr. DEBY (Foreign Secretary) said that as this meeting had borne very much upon the manufacture of steel he might direct the attention of ironmasters to a cheap and unpatented process in use at the Hamoir works. It could be adapted to a blast-furnace for 300, and would secure an increase of 1000 lbs. of metal per 24 hours.

Mr. KIRK, replying upon the whole discussion, said that Mr. Sneles had done a very good thing in putting the working into the form of a balance-sheet. The reason practical men did not take kindly to theories was just because they did not work out in practice, and if they could only get a theory which could stand a balance-sheet like that before them, and stand looking into, he thought practical men would accept it, and not cavil at it. Well, Mr. Sneles thought he had spent a great deal of time over his paper. Of course the report of the Commissioners was something better than anything he had seen before, and he did examine that very closely, and, as Mr. Sneles knew, his book was full of figures and calculations, which he had not troubled them with. He thought they only required the attention of scientific men and practical men together to get at the real science of puddling, and that had been the object of both his papers. Mr. Jones wanted to know how it was that he made it out that only 5.5 cwts. of fettling was used to the ton. If he read his two papers he would have no difficulty in finding that out. He thought very great credit was due to Messrs. Hopkins for carrying on the Danks process in the way they had, and overcoming so many of the difficulties as they had. He thought they would have done it in less than a quarter of the time they had taken if a scientific investigation had been made first. There was one thing Mr. Hopkins mentioned, which was that when they re-heated the ball and the cinder in it the iron became quite crystalline. Now, he found in his experience an increase of phosphorus at that stage, and he thought it was worth their while, as scientific men, to enquire whether it was really an increase of phosphorus, or due to an extra percentage of cinder mixed with the iron.

The discussion on Mr. Simon's paper "On Chaudron's Method of Shaft Sinking through Water-bearing Strata without Pumping, and the Results obtained by it" was adjourned until the autumn meeting. An interesting paper "On Iron v. Wooden Cross-ties for Railroads," by Mr. J. L. Weyers, C.E., of Brussels, was submitted, and the illustrative specimens carefully examined, and some other formal matters having been disposed of the proceedings terminated.

Lectures on Practical Mining in Germany.

CLAUSTHAL MINING SCHOOL NOTES—No. XVIII.*

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SECTION II.

PROSPECTING FOR MINERALS—BORING.

II.—THE CONSIDERATION AND DESCRIPTION OF THE SEPARATE BORING TOOLS.

B.—THE SHAFT RODS.—These may be either of iron or wood.

(A) *Iron Rods.*—The section of these rods is generally square, sometimes somewhat flattened at the corners (or eight sided), this is unnecessary, and costs more. Round rods may be used, but they are not so readily handled as square ones, and a square swelling must be forged at the lower part, so that a key can be made to hold it when unscrewing. Round ones are also dearer. The dimensions of the section are dependent on the depth of the bore hole and the mode of boring. In the case of rotatory boring, and a diameter of 3½ in. to 4 in., a section 1 in. square will suffice for a depth of 90 to 100 fms., although with this the limit of torsional elasticity is exceeded, and the rod may sometimes be twisted into a spiral form. With percussive boring without the use of a free falling apparatus (which should never be carried to a greater depth than 50 fathoms without), 1 in. square will be found sufficient; if the hole is carried any deeper the lower rods should be made 1½ in. in diameter. When a free falling apparatus is used, then up to a depth of 100 fms. a section ¾ in. or ¾ in. square will be found amply sufficient. In one of the deep borings at Neusalzwerk, carried to a depth of 2230 ft., the upper 2130 ft. of rods were 1 in. square in section, and weighed 4½ lbs. per foot in length, the last 90 ft. was carried somewhat thicker in section, and weighed 17½ lbs. per foot of length. The extremes seem to vary between ¾ in. and 2 in.

The separate rods should be made as long as possible, which is limited by the height of the bore tower and the depth of the boring shaft, since the number of joints are diminished, which diminution increases the strength of the rod sets, lessens the cost, and the hindrance and stoppage of the boring. Beer gives the following scale—for rods 1 in. square a length of 12 ft. is desirable, for rods 1½ in. square a length of 15 ft., and for rods 1½ in. square a length of 18 ft. At the deep borings near Schöningen the separate rods were 27 ft. in length, but were unscrewed three at a time (81 ft.), which was about the sum of the depth of the bore shaft plus the height of the bore tower. A greater length than 30 ft. is not advisable, as they are then inconveniently large for handling in the smithy. In many cases one will be limited by the length of the manufactured iron, and the difficulty in welding such long pieces together in the smithy. It is most advisable to make the rods of exactly the same length, since then the raising and unscrewing of the rods will take place much more quickly. Besides the chief rods, shorter lengthening rods are required, the length depending on the amount by which the chain or lengthening screw increases the length of the boring rods. Suppose the lengthening screw lengthens out 18 in., then we shall require rods 1 ft. 6 in., 3 ft., 4 ft. 6 in., 6 ft., 7 ft. 6 in., and 22 ft. 6 in., though we should find it advisable to have an extra rod 15 ft. long, so as to have fewer joints.

The junction of the separate rods is best effected by means of a screwed joint, this is decidedly the best method in the case of percussive boring. The connection is made by forming a screw on the top of one of the rods, which screws into a nut formed at the bottom of the next upper rod. The diameter of the screwed part should be a trifle greater than the side of the rod where it is square in section, that is, the cross section of the two should be pretty nearly the same. As an example—when the rod is 1 in. square the diameter of the screw should be 1½ in., the length 2½ in., with 3 threads to the inch; at Schöningen the rods were 1 in. square, the diameter of the screw 1½ in., the length 2 in., with 4½ threads to the inch. Roost gives, with a diameter of the screw of 1½ in., a length of 3½ in., and 8 to 10 threads; with a diameter of 1½ in., a length of 2½ in., and 8 to 10 threads. It is advisable to make the screw somewhat tapering towards the end, and to cut the screw threads so that only some of them enter into the nut, the rod being screwed further down as the nut or screw are worn away, but it should never be screwed so far down that the two collars on the two separate rods touch each other, this would soon lead to a breakage of the screw.

The joint when completed thus forms an enlargement of the rod, about 2 to 2½ in. diameter, and 4 to 5 in. long, of which the first 1 in. and ½ in. belongs to the upper rod, and the other 3 to 3½ in. to the lower rod. The swelling on the top of one of the single rods serves the purpose of a hold for any grappelling instruments in case the rods break; this collar on the top part of the rods is sometimes placed as much as 6 or 9 in. below the screw, and when the rod is very long there may even be an extra one in the middle; the collar is sometimes square or six-sided, or even octagonal. An arrangement by Herr Kind has the top of the rod gradually enlarged as a square pyramid, and is rounded off at the upper part. A joint devised by M. Degoussé has the upper part of the screw forged smaller than the lower screwed part; this allows of the screw being guided and screwed more quickly into the nut, but the cost of such a joint is more than that of the others. It has been objected to the screwed joint that it only allows of the rods being turned in one direction, as if turned in the other direction the rods might unscrew, but this can readily be obviated either by passing a pin through the joint, or by filing or forging a flat on the joint, and passing a muf to correspond over the joint, the muf being wedged fast, or the outside of the joint might have left-handed screws cut upon it, over which a corresponding nut is screwed. The joint is sometimes effected by making a pyramidal end instead of the screw, which fits into a corresponding hole in the upper rod; the two are made fast by means of a cotter, or bolts; sometimes one of the ends is forked and made flat, the other end fitting between the fork, and being made fast with nuts and bolts. These have the objection that with the constant vibration to which they are subjected they are more likely to become loose and break, and that they occupy more space in the bore hole, so that in case anything fell into the holes the rods are more likely to become wedged fast.

Another method which has been proposed and used, but which does not appear to offer any greater security, and has the disadvantage of greater cost, is to forge a swelling on both ends of the rod, bore a hole in them, and tap them, and to have a single screw which passes to nearly half its depth in both rods; this, as well as the other joints just described, occasion a greater loss of time in fastening together and loosening than the simple nut and screw joints we have first described.

The making of the joint requires great attention on the part of the smith. The screw and nut are generally made first by themselves on account of the difficulty of handling the long rods in a smithy, and afterwards welded to the ends of a long rod. The swelling which forms the nut is best made by coiling a piece of flat iron several times round the end of a bar of iron 10 to 12 in. long, and then welding them together. By this means the threads of the nuts will fall approximately in the direction of the fibres of the piece of flat iron which has been coiled round. The screw has the collar forged on to it previous to cutting the threads; it is usual to make the screw out of hard iron, and the nut out of soft iron. The threads must be chased in a lathe, and all made to one template, so that the rods will fit at any depth at which they may be used; the threads are usually right handed. When the joint is finished it is numbered, the numbers counting upwards when the rods are in the bore hole, so that an invariable order may be kept, which is of importance in saving time. A complete set of rods, 1 square inch in section, weigh about 3 lbs. per foot of length; with rods 1½ in. square in section the weight is from 4½ to 5 lbs. per foot of length.

When boring without the use of a free falling apparatus the rods

* Being Notes on a Course of Lectures on Mining, delivered by Herr Bergrath Dr. von Grotzow, Director of the Royal Bergakademie, Clausthal, the Harz, North Germany.

must be made as straight as possible; in order to test the straightness of the rods they are laid upon the straightening bank; this is a long horizontal bank of wood, somewhat longer than the length of a set of rods, about 3 or 4 ft. broad, and 2½ ft. high, on which is marked a perfectly straight line. The bank is placed outside in the most convenient position for introducing the rods into the bore-house. The rods are straightened with hammers, being first slightly warmed for that purpose; the rods are tested by being brought close to the line on the straightening bank, and turned over on all four sides. Sometimes the rods are tested by being hung up side by side with a plummet line, but the method cannot be regarded as practical.

The rods are raised by means of the winding rope, and hung on a rack in order. Such a rack should be provided in every bore house, as the rods are liable to become bent when leant against the wall of the bore house, and besides saves much time when the rods are screwed or unscrewed, or being raised or lowered. The rack must be placed a little below the winding pulley, either in the scaffolding on which the men stand when screwing and unscrewing the rods, or from 2 ft. to 2½ ft. above. The rack consists of a piece of flat iron 1 in. thick, laid horizontal, which has as many rectangular openings cut in it as there are sets of rods. The width of the openings is somewhat larger than the section of the rods, and the depth about double the width. In the bore tower at Brandeis the rack is made in the highest staging, and of wood. When the weight of the rods is considerable it will be well to cover the rack with iron plate cut to correspond. The lower end of the rods are held in position by a rack attached to one of the shaft timbers. This is made by driving strong nails, which have a ring for the head, into one of the cross beams in the shaft, a wire rod passing through the rings holds the lower ends of the rods in the rack. A rack arrangement used by Herr Kind has the rods suspended from a row of forks which are bolted to short vertical iron bars. These bars have at their upper end a hole, through which a round bar passes. Along this bar, which is fixed to the framework of the bore tower, the short vertical bars with the attached forks, and with them the rods, may be slid. By this means the rods can be brought directly over the bore hole when it is required to screw them on.

(B) *Wooden Boring Rods.*—Before the invention of the free falling apparatus, by deep borings breakages were of pretty frequent occurrence, especially at the joints, so that it was considered advisable to make the rods as long as possible, and to take care that they were light, and yet stiff enough for the borer, who had hold of the upper part of the rods, to perceive the smallest change which took place in the bore hole. As the bore holes were usually full of water, it was thought that by the use of wood the rods when immersed in water could be made as light as wished.

According to Herr Bruckmann wooden rods have been used in Russia so long as boring has been known, and according to Hericard de Thury wooden boring rods have been used in Germany since the 17th century. In 1833 Hofrath C. Glenck used boring rods of wood at Bidingen, Germany; afterwards, in 1837, at Besch and Echernach, in Luxemburg, Herr Kind, who was previously in Glenck's service, made use of the same material. The most suitable wood is pine, but larch (*Pinus larix*, on account of having no branches and the compactness of its fibres), oak, and even Scotch fir may also be used; the latter two, however, are seldom to be had clean and long, the trunk which is chosen must not have grown in the least spirally, and must be free from branches and faults. When a young larch or fir about 3 in. in diameter and 6 to 7 yards in length can be obtained they possess greater strength and torsional resistance than a piece of the same size cut from a larger tree.

In consequence of the diminished weight of wooden rods in water, the work in raising them is diminished, as also the velocity of the fall, and, consequently, the force of the blow. In any case a wooden rod soaked in water, or a saline solution, is lighter than an iron one. At Schöningen the boring rods used were of wood, 2½ in. diameter and 40 ft. 6 in. long, and weighed, inclusive of the iron joints, &c., 143 lbs., or about 3½ lbs. per foot of length; when if iron rods 1 in. square in section had been used they would have weighed 4 lbs. per foot of length.

Since iron rods would be to a certain extent balanced, there is no saving in labour in the boring proper, but when the rods are to be raised or lowered the labour is considerably lessened, and the raising and lowering can take place much more quickly. In the deep borings at Schöningen, which we have already mentioned, the total depth of which was 2013 ft., the lowest 23½ ft. of the boring rods, when made of wood, weighed 902 lbs. in air and 786 lbs. in water, the other 1984½ ft. weighed 7007 lbs. in air and 2047 lbs. in water; if made of iron the upper 1984½ ft. weighed 8076 lbs. in air and 7042 lbs. in water; so that the weight required to be raised when the rods were of wood amounted to 786 + 2047 = 2833 lbs.; when made of iron 786 + 7042 = 7828 lbs., or in the first case 135 lb. per foot of length, and in the second case 39 lbs. per foot of length. According to the experience there obtained the saving of time in raising, when wooden rods were used, amounted to 56 per cent. The wooden rods occupied in raising 1½ hour, the iron ones 3¼ hours; this is taken when raising the whole length, 2013 ft., nine men being employed in both cases.

In the borings at Cessingen Kind used pine, at Echernach oak; the wood used was cut into laths 2 in. square in section, but difficulty was experienced in obtaining straight grown wood, free from knots, &c., of lengths of 25 to 30 ft.; later, when boring at Besch, on the Moselle, he used again pine, 2 in. square in section, and 40 ft. long. It is not now usual to have the rods less than 24 in. square in section. The joint of two rods is usually made by fixing a screw on to the top of the rod, and a nut on the bottom. The part of the joint attached to the lower end of the rod consists of a six-sided nut, which where it abuts the sheet iron cover by which it is attached to the wooden rod has a round collar; the part above is cylindrical, and fits into the sheet iron cover (likewise round), to which it is welded and made further fast by being pinned to the wooden rod with rivets and wedges. The attachment of the screw on the top of the next lower boring rod is made in exactly the same way—that is, the sheet iron cover is welded to the lower part of the screw, and made further fast with rivets, and to the wooden rod with wedges. The point requiring the most care in making the joint is the fastening of the sheet iron cover over the wooden rod. The sheet iron cover forms a conical tube, about 18 in. in length and ¼ in. thick, the narrower end being 2½ in. diameter, the wider 2½ in. diameter; at the end, however, where it fits on to the cylindrical part of the nut or screw, it remains perfectly cylindrical, so that it can be welded and rivetted on. In making the sheet iron cover care should be taken to have the fibres in the direction of the length of the rods, and the long weld must be carefully made; this welding can, however, only take place at the two ends of the cover, the middle portion being rivetted, the rivets must be somewhat sunken. Before the cover and the nut or screw are rivetted to each other, the cover must be passed over the wooden rod and made fast to it; for this purpose the end of the rod is smeared over with oil or tallow, and the narrower end of the cover is filed so as to take off the edge on the inside, to allow of the cover being more readily driven on to the wooden rod. Before doing this the cover is warmed somewhat, so that on cooling it shrinks tight on the rod. The cover is driven on only so far that the rod reaches the commencement of the cylindrical part. In order to make the joint additionally secure it is welded; for this purpose a round hole is made in the middle of the end of the rod, into which a wedge of dry beechwood, 12 to 15 in. long, and 1 to 1½ in. wide at the top, is driven; after that a round iron wedge of the same length, and from 3 to 4 in. wide at the top, and lastly one or two shorter ones, about 7 to 9 in. long, and ¾ in. wide at the top, are driven in.

After the cover and rod are thus made sufficiently fast, the nut or screw is forced on to the cylindrical part of the cover, and is made still faster by inserting three or four rivets. This joint which we have just described is attributed to Von Seckendorf. Kind's arrangement has on both ends of the rod a nut similar to that on the lower end of the rod in Von Seckendorf's arrangement. Between the two is a short middle piece of iron, which has a screw on both ends. Rittinger has simplified the arrangement of Kind—the nut and cover are first forced in one piece, which is drilled through and then tapped. After the cover has been driven some distance on the rod by hand, the middle piece is screwed into the nut; the rod which

is suspended is laid hold of by four men, and the end of the middle piece is driven against a block fixed firmly in the ground. When the end of the wooden rod comes against the nut inside the cover, the middle piece is unscrewed, and an oak wedge is driven tight in. The projecting piece of the wedge which fills the nut is bored out with a flat auger; the middle piece has a collar forged upon it by which the rods are suspended above the bore-guiding tube. When two rods are to be unscrewed an ordinary key is passed over the middle piece above the collar. The rod is embraced at the cover by a key, or rather clamp, so that a set screw, inserted through the clamp, passes into a depression in the cover, which prevents its slipping round. The rods were 30 ft. long, and weighed, including the middle piece, 55 lbs. in air, and only 12 lbs. in water, and were made of young pine or oak, and not cut from a large tree.

A later construction of the joint of wooden rods devised by Kind has the nut and screw similar to the arrangement we have previously described as used by Kind for iron rods; the part where they are attached to the rod is being prolonged to a length of from 30 to 35 in. in a forked manner, both sides, however, being dish to embrace the wooden rods; they may, however, be made rectangular to suit the section of the rod. Over this three or more rings are shrunk on and nailed.

The advantages of using wooden rods are chiefly in very deep borings, and always under the supposition that a free falling apparatus is used, and that the bore-hole is full of water. With the use of Fabian's free-falling apparatus, however, iron rods are to be preferred, since on account of the torsion of the wooden fibres the twist given by the borer at the surface is only transplanted to a certain depth unless the work of the borer (in giving the twist required) is to become very exhausting. The wooden rods have also the disadvantage that when left out of use for a long time their durability is affected, so that when boring is not taking place it is better to allow the boring rods to remain suspended in the bore-hole under water than to leave them to hang dry on the rack in the bore-house; this appears more especially necessary in winter, for when the wet rods are raised and left to hang in the bore-house or in the open air, the water freezing in the pores of the wood cracks it, making long rents, which gradually widen and loosen the joints. The keys are sometimes made single, and at other times double. One of the most common shapes is that of a L, which can be either single or double. The L key is sometimes made to open out slightly instead of remaining parallel, so that the key may be passed over the rods more quickly, and also that it may still fit, notwithstanding any slight changes in the dimensions of the rod, due to forging, &c.

Another common form consists of a round bar of iron with a flat piece in the centre, the flat piece having a slit in it fitting the section of the rods, the slit running approximately in the direction of the length of the key. This form is that generally used at the bottom of the bore shaft, and is made somewhat stronger, as it is sometimes used to suspend the rods by being placed across the mouth of the guiding bore tube, and immediately below one of the collars forged on the rods for that purpose. The double keys are seldom used with free falling borers, as the dimensions of the rods are smaller, and such long handles are not required.

Rods formed from Hollow Iron Tubes.—In order to diminish the weight of the boring rods, and keep them at the same time stiff, Degoussé patented, in 1841, the application of rods formed from hollow iron tubes. The first was used by Von Oeynhausen, in 1845, at the deep borings at Neusalzwerk, the total depth of which was 1900 ft. For this purpose he used rolled iron tubes 1½ in. inside diameter, and 1-6 in. thick, 14 ft. 1 in. long, of which two were joined together, forming a rod 30 ft. long. To the bottom of the tube a rod having a nut at its lower end is attached, and to the top a rod having a screw at its upper end. A collar is forced on to the short rod a little below the screw. The rod which has the screw (about 2½ ft. long) is first brought to a welding heat and driven into the end of the (cold) tube. Care must be taken not to force open the longitudinal weld of the tube. After this, the middle rod upon which the two tubes are welded is in like manner inserted. Such a rod weighs 110 lbs., whilst a massive iron rod for the same purpose would weigh 149 lbs. In order to make the connection between the short rod and the tube more secure two holes are bored at right angles to each other and rivets inserted.

In our next number we shall commence the discussion of free falling borers, a subject which has received a great amount of attention, and which has been brought to a considerable degree of perfection on the Continent.

UNDERGROUND FIRES IN COAL MINES.

At the Manchester Geological Society, on Tuesday, Mr. W. J. GRIMSHAW, of the Stand Lane and Whitfield Collieries, Radcliffe, read a paper "On Underground Fires in Coal Mines," in the course of which he said that great effects were often produced by small causes, and from that point of view fires occurring above ground or below ground were much on a par. An unforeseen occurrence, or careless act, which caused a fire above ground might in a similar manner cause a fire below ground; but, as regarded after results, all similitude ceased. As instances, he might mention that fires of more or less magnitude had come under his notice resulting from the following causes:—1. Ignition of canvas air tubing from a small feeder of gas which had been lighted by a shot, and where the men had left the place and given no alarm for some time afterwards. In this case the fire gained great headway, and after several violent explosions the pits were sealed. On re-opening, about two months afterwards, a violent explosion occurred, and the fire was eventually subdued by flooding the pits. 2. Shots fired at the end of a shift and the places not examined for some time afterwards. 3. A torch-lamp falling into an open grease-box near the pit bottom. 4. Furnace ashes filled into a tub without being properly slacked. 5. A shot bringing coal down solid, and igniting the gas in the break behind. 6. Soot clogged on curbs and sides of a furnace-pit, by accidental influx of water, and ignited two days afterwards. 7. Backing on arching igniting spontaneously. 8. Mouthing 14 yards above the furnace catching fire from the furnace. 9. Timber behind the pit-wall opposite the furnace ignited from the furnace. 10. Spontaneous combustion and burning through, or displacement of, rib or barrier left to cut off a gas fire. In the course of conversation with Mr. J. S. Martins on this subject Mr. Grimshaw said that gentlemen had mentioned the occurrence of two fires at the Hibernia Colliery, Westphalia, one of which was caused by the ignition of a small quantity of gas in an old road, and the flame withdrawing behind a puck, burned so long as to ignite some old timber which had been stored there. The other was caused by a torch lamp placed behind a prop to shade it from the air, and thus igniting the timber. This occurred in a main return airway, through which steam pipes were carried, and the fire extended a distance of about 140 yards in less than six hours. The above tabulation of a few of the causes of underground fires might give some idea of the difficulty of taking any other than general precautions to guard against their recurrence. Comparatively speaking, a fire on the surface came to a definite end in a reasonably definite time, the progress thereof might be marked without risk, and the best means of dealing with it were generally obvious. Many causes, however, conspire to render the extinction of an underground fire a much more arduous and dangerous undertaking, whatever means of dealing with it might be adopted. Broadly speaking, but four courses were open for choice—following the fire up, and extinguishing it with water; flooding the mine, wholly or partially; sealing the shafts, the workings, or part of the same; or filling the mine with carbonic acid. As regarded the first-mentioned course, an interesting paper was read before the Society by John Knowles, Esq., detailing the process as applied to a fire at the Pendlebury Colliery, which was eventually extinguished by this means. Proverbial wisdom said that delays are dangerous, and in no case was the maxim more frequently true than in relation to the dealing with fires occurring in collieries. An hour of active measures at the commencement was often very much more valuable than months would afterwards be, and in addition he believed that generally the earlier a fire was dealt with the safer it was for those engaged in the operations. Following up a fire with water was certainly the

most satisfactory method of dealing with it; the progress that was being made was known; there was greater scope for the exercise of judgment, and greater sense of security than there was for those employed in bricking off a fire; in fact, the difference between the two methods might be likened to the difference between fighting a duel in the open air and in a dark room. Another strong reason in favour of following up a fire with water was that when the fire was subdued work might be resumed, in the majority of cases, in a very short time. The fire was done with, and the great expense of keeping the pit idle for an uncertain period saved. Yet although he considered this method of battling the fire best he did not mean to assert that it ought to, or even could, be tried in all cases. The varying condition of mines, and the constantly varying condition of any one mine, precluded any special provision being made to deal with a fire whenever it occurred by any special means. Consequently, very much depended on individual effort called into action by the emergency. It had been said that the "unexpected always happens," but, unfortunately, few people were gifted with the power of defining the unexpected. Even when means of dealing with the fire were immediately at hand it did not always seem that such a success was achieved. Mr. Grimshaw then gave an account of a fire which occurred at the Drummond Colliery, Nova Scotia, in 1873, and stated that although water was stored near the seat of the fire, and great efforts were made to extinguish it, the pit had eventually to be flooded. The reader of the paper next proceeded to deal with the third method of extinguishing underground fires—by sealing up the shafts and workings, so as to deprive the fire of the air necessary to support combustion, and gave a detailed account of a fire which was dealt with in this manner. After some remarks on gas fires and the effects of concussion in extinguishing flames, Mr. Grimshaw said sometimes a fire occurred which it was impossible to approach sufficiently near to reach with water. Occasionally it was impossible to ascertain the exact locality of the fire. Two courses were open, one being the flooding of the mine, and the other the stopping of the ingress of air. The first method was objectionable if the workings were situated on the rise of the shafts, and had no level communication therewith from their highest point. In a case that came under his notice the mine was flooded to extinguish a fire on the rise. The water was allowed to rise in the shafts to a point considerably above the highest portion of the rise workings. The water remained in some weeks, but on re-entering the mine the fire was found burning, the water not having reached it. The air had been compressed to such an extent as to resist the weight of water, and whilst it rose in the shaft prevented it rising in the workings. Flooding also greatly damaged the workings, in some cases literally ruined them. Sulphur was next mentioned as an agent which might be useful in some cases; and with regard to the operations generally in extinguishing underground fires, Mr. Grimshaw urged that no more men should be in the pit than was strictly necessary. In conclusion, he said that whatever precautions might be taken fires would still occur. The chief necessity was promptitude in dealing with them when they did occur. A mine was not like a workshop, where the workmen might be seen at a glance, but it was rather a collection of workings united with each other by a bond of common safety or common danger, and requiring prompt and intelligent action when the danger arose.

A vote of thanks having been on the motion of Mr. SMITHURST, seconded by Mr. CHADWICK, passed to Mr. Grimshaw for his paper, a short discussion arose upon the matter dealt with.

Mr. DICKINSON said he had had to do with a great many colliery fires, and the paper which had been read was a very practical one, and one which would bear reading. With regard to sulphur and carbonic acid gas, he had seen an attempt made by this means to extinguish a fire at the Great Lever Colliery 25 years ago, and when they opened the colliery some months after the coal was still burning. So far as he had observed, carbonic acid gas was rather injurious than otherwise, the current which was caused by it having a tendency to promote combustion.

Mr. GRIMSHAW thought in the case which Mr. Dickinson had referred to it was not actually carbonic acid gas, but there was with it a large quantity of air, eight or ten times as much. If chemists could discover some means of taking the carbonic acid into the mine solid, so that it could be used just at the place where it was wanted, it would be very useful.

Mr. DICKINSON said that in closing mines he always preferred to shut up the return air course as well as the intake.

Mr. THOMPSON did not think from his own experience that much value was to be attached to the readings of a thermometer put down into the mine after it had been closed. In a case of his own there were results obtained were not worth the trouble of taking.

Mr. DICKINSON said some judgment could be gained from the peculiar smell of the gases emitted from the mine.

Mr. SMITHURST said carbonic acid might do very well where the mine was not thick, but where the coal was 16 ft. thick it would require a tremendous amount of gas to put the fire out. It was also very difficult to shut out the air, and the only really effectual means, in his opinion, was to put in water. He was at Messrs. Pearson and Knowles's pits when they were on fire. They were shut up, as it was thought, effectually, but immediately they were re-opened another explosion took place, two firemen were killed, and then the pit had to be flooded.

Mr. THOMPSON observed that very often water was not obtainable for putting out a fire.

After some further discussion, in which members agreed with Mr. Dickinson that in closing a mine both the intake and return air-course ought to be stopped, the proceedings terminated.

UNITING IRON AND STEEL.—It is well known that in employing either steel or iron for various purposes of manufacture the result desired is frequently only partially attained—as, for instance, tools and other articles made entirely of steel, though possessing great hardness, do not combine therewith the requisite degree of tenacity, while articles made entirely of iron, though possessing great tenacity, are completely wanting in the necessary hardness and elasticity. These inconveniences can only be removed when both steel and iron are so intimately combined as to form a perfect union, whereby the deficiencies existing in either metal are atoned for by the qualities of the other. For this purpose Messrs. ASBECK, OSTHANS, EICKER, of Hagen, Westphalia, manufacture a mass consisting partly of steel and partly of iron, and which they call steel-iron. The novelty, if any, consists in introducing a thin plate of iron at the junction. A chill of cast-iron is divided into two compartments, either by a transverse plate, or by standing a tube within it, and the metals to be united are poured into the separate compartments. Previous to fusion both metals are refined and purified from all substances pernicious to their welding, after which the steel in fusion, as also the soft iron in fusion, are at the same time and in similar proportions cast into the divided chill, the dividing plate of sheet-iron in which welds both the steel and iron so intimately together that they form a perfect union, the sheet-iron serving at the same time not only as a preservative against the compounding of the two metals, but also as a means of their welding. The success of the preceding depends greatly upon the careful and peculiar preparation of the materials, and upon their quality and fitness for welding, as also upon the thickness of the sheet-iron plate, which must be sufficiently thick to resist the burning influences of the metals in fusion, and yet not too thick, otherwise the materials in fusion during their rising in the chill will not bring the plate to welding. The requisite thickness of the sheet-iron is determined by experience, and the dimensions differ naturally in proportion to the transverse cut of the different blocks to be made. The steel and iron are placed on one or other of the dividing sheet or tube, according to the purposes for which the mass is required. The combination is said to be applicable to various purposes; it is explained, for instance, that it will be advantageous to employ steel-iron for rails, anvils, and armour-plates, as the hard steel will diminish the wearing; and armour-plates for safes, to render them burglar-proof, when made of this improved material will, owing to the steel therein, resist the hardest drill, while at the same time the iron preserves such plates from all danger of fracture from blows. All such

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parts of machinery or tools as have either to resist or to produce a strong pressure or strong concussion, such as rollers or axes, are greatly superior when made of this improved material, which combines great internal tenacity with external hardness. The wear of the external material is reduced to a minimum, whilst its internal softness gives it considerable tenacity, and prevents breaking.

SOLID EMERY WHEELS.

Although, when first introduced, workmen had much prejudice against emery wheels, they have long since ascertained that their use was misplaced, and emery grinding is now in great favour, especially with piece hands, so it is not surprising that at the recent meeting of the Iron and Steel Institute a large amount of interest was taken in the solid emery wheels exhibited by Messrs. A. H. BATEMAN and Co., of East Greenwich, who enjoy a very high reputation for the excellence of their manufactures. The opinion is very general that this kind of wheel will at no distant date entirely displace the grindstone, as equal advantage in every respect is secured with a smaller sized wheel, which can be easily and quickly mounted, and is very durable. Their great strength enables them to be run at high speeds, and the angular strength of which they are composed being inferior to the diamond only in hardness, the rapidity with which they cut is marvellous. This is, indeed, no more than would reasonably be expected, when it is considered that grindstones are of very uneven texture, and are mainly composed of water washed and rounded particles of silica. While the stones have to be roughed and picked from time to time, a really good emery wheel ever requires such treatment, presenting always a fresh, free, sharp cutting surface. Owing to this surface, and the very high speed, the work needs to be lightly touched with the wheel, and the selection of heavy men as grinders is done away with, as are also the swinging boards and housings, and appliances for getting pressure. Owing to the moderate size of the wheels, they can be readily turned with diamond tools, and thus always revolve as perfect circles instead of becoming eccentric, and thus presenting a surface upon which good and accurate work is practically impossible, however much care the workman may employ.

With regard to the use of solid wheels it has been very truly remarked that they are not intended to displace the buff wheels of wood and leather. They may do some of the ordinary glazing, but where a high finish is required the buff wheel has the advantage, owing to the fact that it yields under pressure. The solid emery wheel is advantageous, however, as a means of quickly and rapidly preparing the metal for the fine glazing buff wheel. But the best field of all for the solid wheel is on the vice bench, and an excellent authority upon such subjects points out that a wheel so perfectly turned that the work can be kept in continuous contact with it and run at the proper speed, does work in one minute equivalent to that which would be produced if a file a mile long was passed over it in the same time. The probable average speed of filing is about 60 ft. a minute, while the wheel has a surface speed of 550 ft. Almost every piece that needs filing has to be clamped and re-clamped in the vice several times. Now, as a rule the wheel will perfectly finish the work in the time which would ordinarily be occupied in clamping and unclamping in the vice. Here is thus a clear gain of all the time now spent in filing, whilst the facility for manipulation is such that any man who can handle the file properly against his work can still more easily handle his work on the wheel, for the demand on his strength being lessened his whole skill can be employed in guiding the piece to be ground. Machines of large size are furnished for heavy work, and the largest engine builders can use them to advantage. Even they can use moderate sizes for the fitting of keys, &c. But manifestly it is in such factories as employ vices by scores and hundreds that the solid emery wheels can be best applied. One grinding machine can safely be introduced by every manufacturer for each pair of vices now used. The great profit to be derived from the general introduction of solid wheels is in the saving of wages. The next is in the saving in files, and the next in the increase in the daily product and its improved quality.

Corundum is well known as the base of the ruby, sapphire, and similar gems, and emery is this corundum with a slight admixture of oxide of iron, the chief source of supply being Greece and Turkey. The lump mineral as it is obtained from the mines and comes into the market is reduced to powder. The individual grains thus obtained are sorted into sizes by sifting through sieves varying from 8 to 100 lineal meshes to the inch, and if examined microscopically are found (unlike so called sharp sand and other similar materials) to be one mass of sharp angles and points. These points do not wear smooth with friction, but present a constant succession of fresh cutting surfaces. For several years attempts were made to agglomerate these grains into a homogeneous mass with resins and glutinous substances, but all possessed defects either in strength or in glazing by friction against the work. Indeed, it was not until the introduction of the invention by which the wheels supplied by Messrs. Bateman and Co. are produced that anything approaching a perfect wheel was brought into the market. In these wheels the cementing material is an insoluble silicate approaching flint in hardness, and which by a curious chemical process is formed within the substance of the block or wheel, there being no known means of effecting its direct use. This cementing material is so strong that if a block of emery composition made with it be broken it will be found to have fractured through the grains of emery, and not by pulling them out of their matrix. It is so hard as to cut well in itself, and yet sufficiently softer than emery to wear away faster, and thus avoid the glazing that would otherwise inevitably accrue.

This cement being insoluble in water enables blocks prepared with it to be used either wet or dry, although the latter way is in most cases preferable. Small blocks of consolidated emery may be used with great advantage by hand, but a perfectly marvellous result is obtained when the form of a circular disc is adopted, and the same rotated at a high speed. Under these conditions the durability and cutting powers of the material are simply extraordinary, experience having proved that minutes with the wheel will do the work of hours with the file or chisel. The Bateman wheels are a modification of an American pattern, and, although as with all emery wheels a certain amount of judgment is necessary in order to obtain the best results, the experience of large ironworks has shown that they are capable of generally taking the place of the file and vice, that they are thoroughly well designed, and very handy and economic in use.

CENTRAL FOXDALE SILVER LEAD MINING COMPANY—SPECIAL REPORT.

March 23.—The 105 west is being driven by the side of the lode, which will be cut into when drained. The 105 east is also being driven by the side of the lode, a portion of which has been taken down close to the end, and which contains ore, but the value of the lode at this point cannot be stated, as is not cut through. It is shown, however, that the ore recently discovered in this end extends further, and is an important indication for deeper levels. The lode in the 90, east of engine shaft, is very large, only a portion of which is being carried with the end, which portion yields good stones of ore. No. 1 pitch over the 90, on the caunter lode, yields about 1 ton of ore to the fathom. No. 2 pitch, over the 90, yields about 1 1/2 tons to the fathom. No. 1 pitch, over the 75, on caunter lode, east of engine shaft, yields 8 cwt. of ore per fathom. No. 1 pitch, below the 60, east of engine shaft, on caunter lode, yields 5 cwt. of ore per fathom. The lode in the 60, east of engine shaft, on the north pitch of the north lode, yields saving work. No. 1 pitch, at the 10, at Taylor's, yields 6 cwt. of ore to the fathom. The lode in the 47, west of Taylor's, on the north lode, does not yield mineral to present. The immediate object of driving this level at present is to effect a communication to the 60, east of engine shaft, and thereby allow the water at Taylor's to flow back to the 60 engine shaft to the pole fixed there. In addition to this, and what is of vital importance, to hole Taylor's to the workings connected to the engine shaft, and thereby establish proper ventilation throughout both parts of the mine, which is absolutely needful. The 74 cross cut, south of Taylor's, has, it is computed, about 5 or 6 fms. further to be driven to intersect the south lode. This cross-cut, which is now about 6 fms. from the shaft, has gone through a caunter lode, containing stones of ore, and has also intersected several small strings of ore in the country, which are probably drop-pers from the lode ahead, and a point of great consequence will come off here shortly. Pending the communication of the engine shaft workings to Taylor's, it has been found needful to effect artificial ventilation by means of large pipes. This has been carried into effect from surface to the bottom of the mine, and meets the purpose. The pump engine being overloaded by means of serving three sumps, it is found needful,

in order to proceed with the sinking of the engine shaft, which I consider should be done with all dispatch, to lighten its load by cutting off one of the two red sumps. Amy's has in consequence been detached, and the operations in that part of the mine are, therefore, standing in abeyance. A change has within the past two months been introduced in the mode of working the mine, which has even already a beneficial result by creating the raising of ore in tangible quantity. At the end of next week I estimate we shall have dressed and undressed ore to the extent of about 67 tons. About 47 tons of this quantity is already dressed for the market, and we shall, all well, be daily adding thereto. Relative to future returns, I believe I am safe in stating that they are likely to continue and increase, provided the mine is opened out in the right manner, on which much depends. The conclusion I consider the property justifies me in coming to relative to its merits are the following:—1. The present prospects are of a decidedly encouraging nature. —2. That much of the success of the mine will depend on the amount of energy and skill brought to bear on the general and detail operations. —3. That with the right management the mine stands an excellent chance of becoming permanently remunerative. —GEORGE RICKARD.

GREAT EAST FOXDALE SILVER-LEAD MINING COMPANY—SPECIAL REPORT.

March 24.—The lode in the 83, east of engine-shaft, has become disordered and split up into branches in the present end. No. 1 pitch over the 83, east of engine-shaft, yields 1/2 ton of ore per fathom. No. 1 pitch below the 68 yields 8 cwt. of ore to the fathom. No. 1 pitch over the 68 yields 1/2 ton of ore to the fathom. The holing of the eastern shaft from the surface to the 14 will have been effected all well in about four weeks. This will complete a thorough ventilation throughout the whole workings, and will be a vital point gained, as the lack of air greatly impedes operations underground at present. The quantity of ore that will be in hand, dressed and undressed, by the end of the next week—the end of March working month—will be about 34 tons. About 28 tons of this quantity is already dressed for the market. Relative to the general state of the prospects of the mine for making returns of ore I think it needful to remark that although the average yield per fathom of the lode is not large, yet on account of the inexpensive nature of the ground to stop when laid open, lodes of the above value will leave a good margin of profit, the scope of unwrought ground being very large. A judicious extension of operations, and on the side or caunter lode or lodes, is likely to result in greatly increased returns. Very little has been done on the caunter lode driven on in the 40. This lode appears to present indications that cause me to think it may be more valuable than has been supposed, and that more should be seen of it. The conclusion I consider I am justified in coming to relative to the present prospects of the mine are the following:—1. The prosecution of operations on the caunter lode and other promising points is likely to be attended with favourable results. —2. That inasmuch as the mine can be inexpensively worked, comparatively, and the present returns of ore being already sufficient to greatly neutralise the cost, there is a fair chance, with skill and proper management, of the concern being made to answer. —GEORGE RICKARD.

FOREIGN MINING AND METALLURGY.

Some astonishment has been excited at Paris in consequence of comparatively few orders having been received for iron for construction purposes, although operations in the building trade have been resumed with activity. Re-assortments are being made regularly and quietly, so that prices are maintained without sensible variations. In the various centres of production the situation has scarcely changed; the present state of affairs is by no means completely satisfactory. Pig remains at a low price, especially pig for refining. Quotations present no great importance, in consequence of their little firmness; we may, nevertheless, note the fact that in the Meurthe-et-Moselle, the Haute-Marne, and the Nord a quotation of 61. 10s. per ton has become general for ordinary descriptions of iron. It was recently reported that a very heavy order for armatures was pending between the Italian Government and M. Schneider, of the Creusot Works; the importance of this affair has, however, been considerably exaggerated. A large extent of new railway is under consideration in France, but until its construction has been finally determined on by the French Legislature French metallurgical industry will, probably, remain in a rather languishing state.

For a long time past sales of coal have been much reduced in Belgium, but notwithstanding this they are experiencing a further contraction apparently from day to day. The only serious purchases at present appear to be those made by the proprietors of brickyards. Coal for industrial purposes has presented no symptoms of a revival, metallurgical industry continuing in a precarious condition. Quotations present no firmness, production being much in excess of a greatly reduced consumption. In March, 1876, complaints were rife similar to those which are now heard. Since then the aspect of industrial affairs has become, if possible, still worse. There has been scarcely any winter, and domestic quantities of coal have not sold in consequence at all readily; and further, the Belgian Government has not announced for 1877 any contract for coal on account of the Belgian State Railways. Belgian coalowners cannot, of course, regard this state of affairs without apprehension, but the only thing which they can do is to wait.

Stocks of coal appear to have been slightly reduced in France; this is due to the resumption of navigations, which has enabled deliveries to be made more freely, although it is not at all clear that more sales have been effected. As regards prices, they have exhibited no variation; certainly they are not higher or firmer. Some hopes were based on the sugar campaign, but at present the results obtained have presented no very special cause for rejoicing on this head. Business has, in fact, been paralysed by a reciprocal distrust. Buyers have only purchased from day to day, while sellers have been ready to make serious sacrifices in order to obtain large contracts. These observations apply more particularly to the markets of the Nord and the Pas-de-Calais, but the Paris market has not been in a better state; there have been increased supplies, and it is feared that if the present depression continues they will not be disposed of before the next season. The coal market of the Loire basin is in a rather better state; the deliveries are sensibly increasing, and the internal consumption is increasing also, as the metallurgical interest in this part of France is not without employment.

The slight increase of activity which has been recently noticed in the Belgian iron trade appears to have been maintained; at the same time, prices do not revive, and the competition prevailing is inveterate. In a recent sitting of the Belgian Chamber of Representatives the Belgian Minister of Public Works announced that an order for 800 trucks was about to be given out for the Belgian State railways. It was stated recently that the Champagne Forges Company was rolling a special iron for the manufacture of bolts; the process is now said, however, to be not a new one, having been patented by M. Nicaise in February, 1859. It appears that the value of the mineral production of Austria in 1875 amounted to 4,284,500, or 343,300, less than the corresponding value for 1874. Coal was represented in the general production of 1875 by 4,549,000 tons, or 78,000 tons more than in 1874. Ironstone figured in the production of 1875 for 705,000 tons, or 210,000 tons less than in 1874. The value of the coal raised in 1875 in Austria was 1,792,800; of the lignites, 1,542,400; and of the ironstone, 273,500. The value of the production of the metallurgical industry of Austria in 1875 amounted to 2,516,600. Iron furnished 262,000 tons, or 28,000 tons less than in 1874. An adjudication for 6750 tons of Bessemer steel rails for the Berlin and Nordhausen Railway is to take place at Berlin, on April 9. The formation is announced of the Anseremum Forges Company.

There has been comparatively little doing in copper at Paris, and the market has remained without movement. Chilean, in bars, has made 76l. per ton; ditto, ordinary descriptions, 73l. 8s.; ditto, in ingots, 76l.; English best selected, 78l.; and pure Corocoro minerals, 76l. per ton. The German copper markets have presented no special feature of interest. At Rotterdam transactions in tin have been confined to the most pressing requirements of consumption. Disposable Banca has been quoted at 43 1/2, with delivery at the approaching sale, the same description has been priced at 43 1/2. In Billit there has been scarcely any business passing. At Paris Banca has made 77l. 12s.; Straits and Billiton, 76l.; Australian, 79l. 8s.; and English, 76l. per ton. There has been little doing in tin upon the German markets, and prices have been almost nominal. Little has been passing in lead at Paris; French has made 21l. 4s., and lead from other sources 21l. per ton. The German lead markets have been unchanged. The Paris zinc market has been extremely quiet. Silesian, delivered at Havre, has brought 21l. 16s.; ditto, other good marks, 21l. 16s.; ditto, at Paris, 21l. 18s. per ton. At Marseilles, rolled Vieille-Montagne zinc has realised 30l. 16s. per ton. The German zinc markets have been pretty well maintained.

ECHOES FROM THE MINING MARKET.

The feeling of doubt engendered by the failure of the Burry Port Smelting Company is rapidly passing away, and during the week a very fair business has been transacted in lead shares. Many investors have seized the opportunity to increase their holdings, and the prices at which shares were obtainable soon after the news of the failure was known will enable some handsome profits to be made as soon as the affair has completely blown over. In the majority of cases the loss, we believe, will be only a temporary inconvenience. There have been some close escapes by one or two progressive miners. It was rumoured Van Conso's would be a creditor, and the shares rose to 2-3/4; but it transpired the company's ore bill was due, and was paid on the 3rd instant, consequently the shareholders will not lose by the failure. Other companies were not so fortunate, and to the list given last week we must add West Chiverton, West Tankerville, and some Welsh mines.

Business in other departments has been quiet generally, although for certain shares there has been a brisk demand. We may instance Exchequer, I. & L., and Richmond in foreign, and Hington Down and Farya Mountain in home copper shares. Richmond although largely dealt in have receded. The colliery share market is extremely dull.

The accounts of the Javali Company for the year 1876 have been issued, and show that, although the exceptionally adverse circumstances which characterised that year had to be contended with, considerable progress has been made, as compared with past years. The ore crushed has amounted to 17,695 tons, against 8850 tons in 1875, 10,967 tons in 1874, and 14,550 tons in 1873. The value realised has nearly doubled since 1873, the amounts being 14,274, against 7483. The profit per ton crushed has been 4s. 3d., against 3s. 3d. in 1875, 2s. 1d. in 1874, and a loss of 2d. in 1873. So altogether the directors can fairly claim to have made steady progress towards the dividend goal. The profit on the year has amounted to 2738s.

A meeting of the North Laxey shareholders will be held on the 12th proximo. The reports from the Pandora Mine are very encouraging, and show that before long a very productive mine will be opened up. Capt. Nottingham states that at no time of its existence were the prospects so good as they are at present. There is but little news from Cornwall. The close proximity of the Easter holidays has interfered with the slight business that was doing whilst tin keeps up in price. There are symptoms, however, of some reaction from present low quotations. Stocks of the metal do not increase, and the Australian supplies are now fairly gauged. The demand for tin plates, we understand, is good, and is increasing. At Dolcoath the second rock level in the 326 fm. level is working well. The results obtained have been very satisfactory, as three times the distance can be driven per month than if six men had been employed to drive by hand labour, whilst the cost of driving by the machine shows a reduction of 20 per cent. on the cost of manual labour. There is a good mine in the lower levels. At Wheal Agar the lode in the shaft continues as rich as last reported. The branch on the south side, hitherto poorer than on the north side, has much improved, and shows quite two thirds tin. JAMES H. CROFTS.

THE WEEK.

SATURDAY, MARCH 24.—I mentioned last week that Roman Gravel had recently sold 220 tons of lead to the Burry Port Company. I am glad to find this to be an error. For the correction I am indebted to Mr. F. F. Wilson, the secretary. The total commitments to the smelting company are understood to be below 1700t. The markets were extremely depressed until nearly the close, when the arrival of firm prices from Paris led to a rally. On the appearance of this recovery several "bears" well aware that settlement commenced on Monday, made haste to close so that on the whole the markets left off pretty steady. Calcutta was forced down below 125, but closed 125 1/2. Great Western left off at 103 1/2, a decline of 3/4, and there was the same decline in Metropolitan District (45 1/2 to 46), and Brighton A (108 1/2 to 107). Russian of 1873 closed at 85, being 3/4 worse. One or two of the railway loans where wide prices prevail were reported to have lost 1 and 2 per cent. There was an average fall of 1/2 in the various Hungarian issues. Egyptian, 50 1/2 to 50 3/4, against 52 1/2 to this week. A fall of 20, according to the Official List, was made in St. John del Rey. It does not, however, contain the trace of a transaction.

MONDAY (Continuation-Day).—Rates for carry over until next account were very easy to-day, contango or backwardation hardly in any instance exceeding 3/4. This was the rate of the "back" on Russian of 1873, which made up at 84, against 83 last time. During the interval 8 1/2 has been reached, but those who have kept open have after all only been mulcted in a difference of 1 per cent. It is pointed out that the expenses at Kishineff alone since the army was mobilised must have reached eleven millions sterling, thus seriously jeopardising the chances of the coupons being met much longer. Egyptian of 1873 made up at 49 1/2, against 48 last time, but since then they have been dealt in at 54. No such fluctuations have taken place in railways. The price of alteration has been in North British, continued this time at 98 1/2, last time at 99 1/2, and dealt in between the two periods at 100 1/2. Sheffield made up at 73 1/2, same as last account. Great Eastern made up at 50 1/2, against 51 1/2. The settlement showed a large and weak "bull" account, a considerable quantity of which up to the close could not be carried over, although 2s. 6d. was offered.

TUESDAY.—Until the afternoon prices were again down, and promised in several instances to finish at an important decline, but between three and four o'clock it came to be rumoured that the Chancellor of the Exchequer had made a statement indicating there was still a chance of a pacific settlement. The remarks as read late this evening are guarded, and common place enough, but the rumour fell like a shell among the dealers in the Russian market. The 1873 loan was previously dealt between 83 1/2 and 84, but so long and exciting was the bidding that less than half an hour forced the price up to 85, and unsatisfied operators left the building at a late hour very reluctantly. Hungarian 6 per cent., 1871, advanced 2, to 54 1/2; Egyptian, 1873, rose 3/4, to 61. In railways Calcutta was a good market, and went up 1/2, to 126 1/2. Illinois Central fell to 44 1/2.

WEDNESDAY.—Among the traffic returns to-day Midland showed an increase of 3365L., North-Eastern one of 2438L., Great Western one of 2897L. Calcutta had an increase of 1009L. Foreign bonds were again strong, especially Russian, operators apparently fearing to go away for their Easter holidays with much open for a fall. The 1875 issue rose to 81 1/2 from 80, the 1873 closed 86 1/2 to 87 1/2. Calcutta fully maintained yesterday's price, closing 123 1/2 to 123 3/4 ex div. (3d.). Brighton, A, as usual just before Easter was in demand, the last price was 107 1/2 to 107 3/4.

THURSDAY.—The near approach of the Easter holidays was very apparent from the scanty attendance of members in the House. By noon the numbers had been further sensibly thinned. At the onset a disposition was shown to send prices down, but it was not long before the decline had been recovered, and in some instances an advance, notably in Russian and Egyptians established. At 12 o'clock Consols had risen 3/4, to 86 3/4, and this led to firmness in the Home Railway Department. At 4 1/2 the Government broker bought 30,000 Consols, yesterday he obtained the same amount for 86 3/4. FERDINAND R. KIRK.

Birch Lane, March 29.

LLANRWST.—This mine is opening out very satisfactorily, corresponding with Capt. Knapp's statement at the meeting. He said "the further they drove the deeper the lodes were being sunk upon. The veins were now productive, and the lead richer in quality." Capt. Knapp says "the Van Mine was an exceptional one, but if the Llansantwyllyn mine could be improved for the next two years as it has done in the past, it will be second to no other mine in the Principality, and there is no doubt from all appearances it will do so."

SALE OF MINE MATERIALS.—Mr. John Thomas held an auction at Burra Burra Mine, on Thursday, for the sale of materials. There was a large attendance, but in consequence of the depressed condition of the mining interest in the neighbourhood, nothing but the pitwork was sold, and when we state that to place the work in its present position it cost the adventurers 6l. per ton, while the price realised at the sale was 2s. 10d. per cwt., some idea may be gathered of the condition of the market for mine materials; yet the purchasers, Messrs. Harvey and Co., of Hayle, and Messrs. F. W. Michell and Co., declined to advance upon that price, and the engine and much of the heavy iron work remained unsold. —West Briton.

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Mining Correspondence.

BRITISH MINES.

ABERDAUNANT.—S. Toy, March 28: The men that are engaged in cutting down the new shaft will, I think, finish it to the back of the deep adit level the latter part of next week, also finish their contract, when I will set them to square it down to the bottom of the level (7 ft. deeper), and cut a pit, take up all top water, &c., which must be done before we can sink the shaft below the deep adit level. In the east part of the sett (Crownwin) in the cross-cut driving towards the new level we have cut a stream of water in the bottom of the forebore, which has drained the level dry behind us, but we have not yet met with the level.

BLUE HILLS.—S. Bennetts, A. Gripe, March 24: The north section of the lode has not yet been reached in the rise on the gossan above the 80. There is, however, a large stream of water issuing from the top of the rise, which indicates a near approach to the lode. On the south side of this gossan the lode is worth 107 per fathom on the west side of the shaft. During the past few days we have utilised a falling stream of water in the shaft for the purpose of ventilating the rise and slope, and succeeded in doing so very satisfactorily.

BOULDRILL.—H. Hotchkiss, March 28: The 60 yard level cross cut driving south for Maes-y-drill has undergone a very sudden change; the end is now workable for 4 ft. wide, containing spar, clay, and boulders of limestone, and letting out water freely. This is a very important change, as it will enable us to make much better progress. There is also a slight improvement for lead ore and blende in the 45 yard level driving east, on main lode, although we are not as yet through the it. All other points of operation are without change worthy of note. Everything is going on regularly, and with all speed possible.

BRONFLOYD.—Thomas Kemp, March 28: No. 3 Shaft, North Lode: The sinking of this shaft below the 110 is urged on with all practical speed, and all progress is still being made. The slopes and other bargains throughout the mine are without any change worthy of notice since my last report. As instructions have been given to Mr. Green to get on with the new water-wheel and machinery it is desirable that we should at once commence to cut the ground for the wheel pit, &c., so that there may not be any delay in carrying out this work. The 25 tons of ore sold to the Panther Company on Wednesday, 21st instant, realised 157. 15s. per ton. Hauling and dressing going on with regularity, and we are pushing on as fast as possible with our next sampling. Machinery in fair working order.

CLEMENTINA.—W. Bennetts, March 29: I am glad to inform you that the lode in the engine-shaft is now worth 1 ton of lead per fathom. It is a splendid looking lode. The 25 end has again improved, and is now worth 15 cwt. of lead per fathom.

March 27: The lode in the engine-shaft is still worth 1 ton of lead per fathom, and by its kindly appearance a further improvement may be expected. The 25 end south has further improved, and is now worth 1 ton of lead per fathom, and is looking promising for further improvement.

COMBARTIN.—E. Hosking, March 24: Since I last visited the mine Harris's shaft has been cleared to the 28. The last 5 fms. have been difficult to do in consequence of the ground having broken away at each end of the shaft, which required it to be firmly timbered and secured. This has been done, and the 28 cross-cut cleared and secured for 2 fms. south of the shaft. The men are now daily peeping to reach the lode. When this is done we anticipate finding lead ground, which will pay to work, as one of the men now working in the mine worked in the 28 at the last working, and says the lode there will yield 1½ ton of silver-lead per fathom, and that a winze is communicated from the 28 to the 42 (or deep adit level) the end of which will yield lead that will set on tribute. The capel part of the lode is now showing in the level, and contains mounds and spots of lead. Seeing that it is highly important to clear the 28 as quickly as possible we have put on three additional men, so that no time shall be lost in clearing the 28. The stuff cleared out in a few days. The 15 has been driven 7 fms. during the last four weeks. The end has been producing lead for the whole distance. The lode in the end is 2 ft. wide, producing saving work for silver-lead. I am of opinion that we shall get a richer lode at and below the 28.

CWM ELAN (NEW).—J. Goldsworthy, March 24: There is no material change to notice in the underground bargains since my last report. I beg to call your attention to an important point; I should strongly advise you to drive the 10 west to intersect No. 2 cross-course, which is about 5 fms. apart from the western cross-course; I am confident the piece of ground between the said cross-course and the existing level will be productive; the levels below are a sufficient proof that there is paying ground in that direction. The lode we are driving upon in the present end will nearly meet expenses for working. We are pushing forward as fast as possible for another parcel of blende ore. The weather at intervals is against surface work.

DERESBY MOUNTAIN.—W. Bennetts, March 27: Instead of cross-cutting to the lode we have commenced to stop down the lode at the point where the former workers missed it, which was back about 8 fms. from the end. When we commenced the lode was very small and poor. We have stripped down the lode about 8 ft., and I am glad to say that it is now worth 7 cwt. of lead and the same quantity of blende per fathom.

DERVENT.—John Morpeth, March 25: Setting Report for April: Jeffries Shaft, Middle Vein: This vein in the 95, 43 fms. east of shaft, is still very promising. We are taking 2 ft. of the vein in the level, and for this width it produces 8 cwt. of ore per fathom. Over this level we have seven bargains, the first a stop 35 fms. east of the shaft, yields 17 cwt. of ore per fathom, vein 4 ft. wide; the second, a stop 30 fms. east of shaft, yields 20 cwt. of ore per fathom, vein 3 ft. wide; the third, cutting flats on the north side of vein, which are rich, and worth at least 2 tons of ore per fathom, looking well; the fourth, a stop 22 fms. east of shaft, vein 3 ft. wide, but yielding only 11 cwt. of ore per fathom; the fifth, a stop 18 fms. east of shaft, producing 14 cwt. of ore per fathom, vein 4 ft. wide; the sixth, cutting south side of vein, 18 fms. east of shaft, vein coarse, worth 14 cwt. ore per cubic fathom; and the seventh, a stop 15 fms. east of shaft, worth 15 cwt. ore per cubic fathom, vein 4 ft. wide. The cross-cut at the 95 opposite shaft has been extended northwards the last month 4 fms. 1 ft. 4 in., now across 15 fms. 6 in. The 93, 105 fms. west of shaft, is in a strong vein 4 ft. wide, and produces 6 cwt. ore per fathom. The three stops following this end in the back are yielding strong towse. No. 1, 21 fms. west of shaft, is 7 ft. wide, and produces about 19 cwt. ore per fathom. No. 2, 93 fms. west of shaft, is 8 ft. wide, worth 32 cwt. ore per fathom. No. 3, 88 fms. west of shaft, is also 8 ft. wide, but coarser, worth 21 cwt. ore per fathom. Sun Vein: The cross-cut at the 70 from shaft was driven last month 2 fms. 5 ft. 6 in., with making any further discovery. The distance this cross-cut has now been extended southwards is 23 fms. 3 ft. 3 in., and we have deemed it best to stop the cross-cut, and to put the men to sink the winze where there was a lively rat under the cross-cut a few months ago, to prove the low flat in the little limestone. North Vein: This vein in the 50, 195 fms. east of Reid's shaft, is small and poor. Taylor's Shaft, Middle Vein: This shaft is now repaired down to the 40, a point some 92 fms. under surface. The cross-cut at the 40, 120 fms. east of shaft, was driven last month 2 fms. 1 ft. 8 in., and is now across 14 fms. 3 ft. 6 in. We have lately passed through some open joints or cracks, and we should sink the shaft to the bottom of the level. West's Shaft, Middle Vein: The 74, 152 fms. west of shaft, is 2 ft. wide of vein, and worth 10 cwt. of ore per fathom. The slope over this level yields 20 cwt. ore per fathom; vein 3 ft. wide. The 93, 37 fms. east of shaft, has the last month been driven by the side of vein, and until we strip it down we cannot give its size and value. This level and the 74 are both standing till we get the pulley framing at West's shaft top completed, which work would not occupy us long now if the weather would permit. The machinery is working fairly.

DEVON GREAT.—J. Richards, March 29: Wheel Anna Maria: In Blackwell's shaft sinking on the new south lode the lode continues about 2 ft. wide, consisting of gossan, capel, quartz, and mounds. Engine Shaft: In the 80, west of Jeffries's cross-cut, on the new south lode, the lode is 1½ ft. wide, composed of capel and quartz. Wheel Emma, New Shaft New South Lode: In the 175 east the lode continues 2 ft. wide, worth 1 ton of ore per fathom. In the 175 east, on the south part of the lode, the lode continues large, 5 ft. of which is being carried, in which there is a leader of ore worth 1 ton per fathom, and a branch of mounds about 1 ft. wide. In the 160 east the lode is improving, and is now worth 6 tons of ore or 200 cwt. per fathom. In Gorrell's winze, sinking below the 160 east, the lode is being carried, which is worth for the length of the winze, 9 ft. from 6 to 7 tons, or 250 cwt. per fathom. In the 145 east the lode is 2½ ft. wide, worth 1 ton of ore, or 40 cwt. per fathom. In Toy's winze, sinking in the bottom of the 145 east, 3 ft. of the lode is being carried, which is a good course of ore, yielding for the length of winze (9 ft.) 9 tons, worth 350 cwt. per fathom, with a valuable portion of the lode standing north. In Bickle's winze sinking below the 130, west of Tregey's cross-cut, the lode is further improved, and is now worth 7 tons of ore, or 250 cwt. per fathom. In the 130 east, east of Killo's cross-cut, the lode is 2 ft. wide, worth 3 tons of ore, or 100 cwt. per fathom.

EAST DAREN.—March 27: In the 130, west of Skinner's shaft, the lode is 1½ yard wide, yielding small spots of lead ore, but not of any value. In the 130, east of Lewis's winze, the lode is about 2 ft. wide, composed of a light clay-slate, carbonate of lime, and small branches of lead ore, but not sufficient to value. Pearce's winze under the 116 is down the required depth for the 130; the lode is small, soft, and poor at this point. We shall drive westward to communicate to the 130 east. In the 80, west of cross-cut on the south part of the lode the lode has much improved, being composed of a light clay-slate, carbonate of lime, and lead ore, yielding of the latter about 1 ton per fathom. The tribute pitches throughout the mine are without change to notice since last reported on. Our machinery is in good working order, drawing and dressing being steadily carried on with a full supply of water.

EAST VAN.—Wm. Williams, March 27: The cross-cut south at the present end of the 40 is in 4 fms.; we cut into water here to-day. I believe this is a very good trial, and that we shall not be very long before we discover lead here. The drivings east and west of Tempest shaft look very kindly, both producing good stones of ore, but not very rich enough. No change of importance in any other part of the mine. You will have a full report next week with setting list.

EAST WHEAT LOVELL.—R. Quantrell, March 29: Fatwork: We have opened out the south side of the shaft about 9 fms. below the 100 to granite, and are satisfied that we have sunk on the main part of the lode. We have put six of the men to drive the 100 west, as we wish to see if it will improve in that direction; the lode is 2½ ft. wide, containing a little tin. We have got through the lode in the cross-cut north at the 17, and find it 18 ft. wide. We have commenced to drive east and west with a fall pipe in each end, and from the appearance of the lode we think there is a very good prospect of our meeting with a run of tin ground. Tregonis: The lode in the shaft at the west is 8 in. wide and there are some small branches coming into it from the north containing a little tin, which I think likely to improve the lode. Last week the lode in the shaft below the adit did not look so well, but it is now worth quite as much as last reported—12½ per fathom for length of shaft.

FRAK MILLS.—J. Rowe, N. Addams, March 29: The lode in the 100, north of engine-shaft, is disordered by a slide, and we are cross-cutting west of the present end to meet with it. The lode in the winze sinking below this level is producing 1 ton per fathom. The lode in the back of this level is yielding 12 cwt. of lead ore per fathom. The slope in the back of the 60, north of the engine-shaft, is producing 6 cwt. of lead ore per fathom. The lode in the 72, north of the cross-cut, west of the boundary rise, is composed of apophane iron, and producing a little lead. The slopes in the back of this level is yielding 7 cwt. of lead ore per fathom. The lode in the slope in the back of the 60, north of the boundary rise, is disordered by the flook, but by present appearance it will improve again shortly. The slopes in the back of the 45, south of east cross-cut, north of Orchard all-shaft, on the east branches, are producing 8 cwt. of lead ore per fathom. The tribute pitches throughout the mine are without change to notice since last reported. The foundations of the new crusher and engine-house for treating the large quantities of halvans on the mine are nearly completed, and we shall be ready for the masons in a day or two.

GAWTON COPPER.—George Rowe, G. Rowe, jun., March 27: The lode in the 132 fm. level east is 4 ft. wide, and worth 6½ per fathom. The lode in the slope below the 117 is 6 ft. wide, and worth 14½ per fathom. The lode in the 105 east is 3 ft. wide, and unproductive. The ground in the cross-cut driving south at the 105 is highly mineralised, and showing indications of being near the south lode. The lode in the 82 east is 4 ft. wide, of a most promising appearance, producing very strong mounds, with good stones of ore. The ground in the 82 cross-cut south is improved for progress, and showing indications of being near one of the south lodes. At other points we are without change. We are busily engaged in preparing for our next sampling, which we calculate will be about 200 tons of copper ore.

GREAT DYLLIFFE.—Edward Rogers, March 28: Dylliffe Lode: The 132 is driving east of engine-shaft, by six men, at 7½ per fathom, lode worth 18½ per fathom. At this level, west of the shaft, there are six men stopping the back, at 4½ per fathom, lode worth 16½ per fathom; we shall commence driving the end again about the middle of the present month. At the 123, west of boundary shaft, we are stripping the side of the level, by four men, at 4½ per fathom, lode worth 8½ per fathom. The winze in bottom of the 120, east of shaft, is sinking by the footwall side of the lode, by three men, at 7½ per fathom; the lode when last cut into was worth 16½ per fathom. At the 105, east of cross-cut, the rise is set to six men, at 9½ per fathom, lode worth 20½ per fathom. In the bottom of this level west two men are sinking a winze, at 7½ per fathom, lode worth 7½ or 8½ per fathom. At the 60 four men are put to cross-cut north, at 9½ per fathom. The 40 Shovel is being driven by four men, at 8½ per fathom; the lode is 3 ft. wide, and unproductive. Lechwood Lode: In the back of the 105 there are four men rising at 1½ per fathom and 7½ per fathom for the lead, lode worth about 8½ or 9½ per fathom. The tribute setting is as follows:—Four men at 3½ per fathom, four men at 4½, eight men at 6½, sixteen men at 5½, twelve men at 5½, 10½, four men at 6½, eight men at 6½, four men at 7½, and 31 men at 7½, 10½ per fathom.

GREAT RETALLACK.—J. Harris, March 24: In the 20 cross-cut the lode is altered in its character to what it was when I last addressed you. Instead of the clayey substance, we have intersected veins of white iron with a little mounds, and patches of kilas.

GROGWINION.—John Kitto, March 23: I am glad to say the ore in the winze sinking below the 24, on No. 4 lode, has continued very good during the whole of the past month, and the same remark applies to the end driving towards the bottom of said winze in the intermediate level. These two points will be communicated before the end of next week, and will ventilate both levels (the 24 and intermediate), and open up a large quantity of good ore ground for slopes. The intermediate level, on No. 3 lode, has been poor during the past month, and the 35 is now passing through the channel of unproductive ground, which we have had in all the levels above, we are, however, daily expecting the former to resume its usual ore-bearing character. The 25 on the same lode is yielding good ore, and the slopes in the various levels are without change to notice. The rise in the roof of the long drift, on No. 1 lode, is yielding some nice solid ore, and I believe this will further improve as it gets higher up and nearer the old surface workings. The end of the level is poor at present, but I am of opinion that the main part of the lode is further to the north, and have directed the driving to be continued in the direction of the present month. We have sold 100 tons of ore at 14½, 6d. per ton, and shall sell similar quantity for the current month.

GUNSLAKE (Clitters).—W. Skevis, March 25: We are progressing favourably with the necessary work for sinking the engine shaft from the 200 to the 212. There is no particular change in the general working or value of the mine since last report.

HINGTON DOWN CONSOLS.—James Richards, March 28: The lode in the shaft sinking below the 160 has further improved since the report of last week, the portion of the lode carried, 18 in. wide, being worth for the length of the shaft 20 tons of ore per fathom. There is also a very valuable change in the ground, both for progress and for the production of mineral. In the 160, west the lode continues 4 ft. wide, worth 3 tons, or 12½ per fathom. In the 160, east of Nicholls's winze, driving towards the shaft, the lode is worth 4 tons, or 15½ per fathom. In the 150 west, on the south part of the lode, the lode is worth 3 tons, or 10½ per fathom. In the slope in back of the 150 west the lode continues worth 6 tons of ore, or 18½ per fathom. In the slope east of Chynoweth's rise, in back of the 140 west, the lode continues worth 5 tons of ore, or 20½ per fathom. In the 140 west, on the north part of the lode, the lode is worth 2 tons, or 8½ per fathom. In the 110 west, on the south part of the lode, the lode is very promising, and yields 2 tons of ore, or 8½ per fathom. In the slope in back of the 110 west the lode is worth 4 tons, or 12½ per fathom. The pitches are yielding their usual quantities of ore.

HOLMBUSH.—H. Bennett, March 28: The following is the setting report of this mine:—The engine-shaft is down 16 fms. below the 60; as we are down to where the cross-course passes through the shaft we find it necessary to put in more timber than usual, but the work is being pushed on as fast as possible. The 60 is being driven south, by 12 men, are worth 22½ per fathom; in driving this level we have met with two branches of what we consider to be the Holmbush lode; they contain some good spots of copper ore. We are still pushing on south in order to meet with the main part. The lead lode has a very kindly appearance, containing spots of lead and sulphur mounds. The 60 is set to drive south on a branch, by two men, at 55½ per fathom; this is a very kindly branch, containing good spots of lead and sulphur mounds. The 40 is set to drive east of Miller's shaft, by six men, at 4½ per fathom, the lode being worth 25½ per fathom. We have about 20 tons of ore in the level. Lord's shaft: This level is opening up a good piece of ground, and when Lord's shaft will enable us to increase our returns. The 20 is set to drive east of Bennett's shaft, on the flap jack hole, by four men, at 4½ per fathom; the lode is large, and letting out a large quantity of water. It contains a little mounds, but not sufficient to value. The 50, 60, and 70, on the flap, are being cleared with all possible dispatch, and we hope to commence stopping from these levels during the present month. An extensive run of ground has been opened up on this lode, and we shall set a number of men stopping as soon as the levels are cleared. Stopping: Nos. 1 and 2 stops in the back of the 60, west of Miller's shaft, by 12 men, are worth 22½ per fathom on an average. Nos. 3 and 4 stops in the back of the 60, west of Miller's shaft, by six men, are worth each 20½ per fathom. Nos. 1, 2, and 3 stops in the back of the 60, east of Miller's shaft, worked by six men each, are worth on an average 27½ per fathom. Nos. 4, 5, and 6 stops in the back of the 60, east of Miller's shaft, by 14 men, are worth 26½ per fathom on an average. No. 1 stop in the back of the 60, west of Lord's shaft, worked by six men each, are each worth 22½ per fathom. Nos. 2 and 3 stops in the back of the 60, west of Lord's shaft, worked by ten men, are worth on an average 17½ per fathom. Nos. 4 and 5 stops in the back of the 60, west of Lord's shaft, worked by four men each, are worth 22½ per fathom each. Nos. 3, 4, and 5 stops in the back of the 70, west of Miller's shaft, worked by eight men, are worth 20½ per fathom each. No. 6 stop in the back of the 70, west of Miller's shaft, by four men, is worth 28 per fathom. A stop in the bottom of the 40, east of Miller's shaft, by four men, is worth 20½ per fathom. Nos. 1 and 2 stops in the back of the 40, east of Miller's shaft, worked by 10 men, are worth 22½ per fathom each. Nos. 3 and 4 stops in the back of the 40, east of Miller's shaft, by four men, are worth 17½ per fathom each. In conclusion, I beg to remark that we have completed the sinking of Lord's shaft from the surface to the 30, and have now put in divisions from the 30 to the 60. The carpenters are busily engaged erecting pulley stands, and other surface work is being got on with as fast as possible. The whole of the machinery is in good working order.

LADYWELL.—A. Waters, March 28: The 32 south is now yielding good lumps of lead ore. We are clearing out the 15 south, with a view of resuming the drivage of the level in the 15 south there is a fine looking lode, yielding small rocks of lead ore, and it would seem that a valuable piece of ore ground is now before us here. We sell to-morrow 20 tons lead ore.

LANDLOES (Lead).—John Kitto, March 23: I have nothing whatever new to report to you. The slopes in the back of the 72 continue to yield a full average quantity of ore, but there has been no change since my last report in any other part of the mine. I have still, however, strong faith in going down, and fully believe in a successful future if the necessary funds are provided, but if this is not done all our previous exertions and expenditure must be sacrificed, and to me this would seem perfectly useless. Mr. Robt. Knapp, March 26: The mine continues to open out well especially the winze sinking under the adit, which improves every foot it is sunk; this is the deepest point in the mine.

MARK VALLEY.—W. George, James Stenlake, March 29: During the past week the lode in the 50 end west has been disordered by a patch of clay, which has caused a falling off in its value, but this, we think, is only temporary; it will now yield 2 tons of ore per fathom. The lode in the 30 end continues to look very promising, and is yielding 1½ ton of ore per fathom. The lode in the 19 west continues to look very promising.

MELINDUR (Lead).—John Kitto, March 22: I have really nothing new to report to you. The south lode, on which we are driving east at the adit level, is very large and strong, and sometimes shows a good appearance, yielding occasional spots of lead ore, and I consider its development well worth further prosecution. The slopes in the back of the 14 and adit levels are still yielding sufficient ore to pay for working, but will not leave much profit, and unless we make some fresh discoveries these will soon become exhausted. It seems to me that the chance of the south lode becoming productive is really all that we have now to depend upon.

MELANEAR.—March 26: There is no change in any of the bargains since last report, except that we have cut the lode in the 60 cross-cut south of Gundry's shaft, and find it to be 6 ft. wide, a sparry lode, mixed with a good deal of blende, and producing 3 tons of copper ore per fathom. We have resumed the sinking of Gundry's shaft below the 75 this week, and shall make every exertion to reach the 85 as quickly as possible. All our machinery is working well, and the water in the mine is very much abated. The old engine is now going 10½ strokes per minute, and Gundry's 2½ strokes per minute.

MOYDD GOULDE.—J. Rowe, March 28: We have driven into the lode at the 24 about 12 ft., which has proved to be principally clay-slate, letting out a large quantity of water, and without mineral to value. Judging from the level above we may expect an improvement before we reach the north wall. The 12 west on the south lode is again improving, and likely to increase in value as we advance. We have not driven much here the last fortnight, the men having been engaged about the new pumps from the 12 to the 24, and making filterings, pools, &c. These things are now completed, and the men returned to their bargains underground. The 12 east on the main lode looks better than for some time past, and promising for further improve. The slopes continue to yield fair quality of ore, and we are progressing favourably towards our next sampling. All in good working order.

NORTH CORNWALL.—T. Dudge: There is nothing new that requires particular remark since my last. We are moving on slowly with surface work, but hope shortly to increase our strength, and get the required work done, so that we may get to work upon those lodes which have such a splendid appearance; very few lodes show such indications so near the surface.

NORTH LAXEY.—R. Rowe, March 27: I have to-day made a careful examination of the mine, and have nothing specially new to report. The lode in the shaft sinking below the 135 tends to increase in size, now fully 3 ft. wide, and there is a little more lead through the lode, and the ground is becoming easier for sinking. The various slopes from the 121 to the 40 are of the same value as recently reported; they are yielding an increased quantity of stuff, and we are making satisfactory progress on the washing floors towards another sampling.

OLD TREBURET.—W. Hancock, W. T. Bryant, March 28: The 102 to drive south of the engine-shaft on the east part of the lode for speed, by six men, the month, at 6½ per fathom. The ore bearing part will be taken down by another party of men when convenient. A stop in the back of the level, by four men, at 4½ per fathom, the lode is worth 8½ per fathom. The 90 fathom level to drive south of the shaft, on the east part of the lode, for speed also, by six men, two months, at 9½ per fathom; letting out water freely, not a bad

sign. A slope in the back to be carried 6 ft. high and strip down the western part of the lode close to the end, by four men, the month, at 3½ per fathom, worth about 10½ per fathom. No. 2 winze to sink below the level, on the west part of the lode, by two men, the month, at 7½ per fathom, worth about 7½ per fathom—a most promising lode. No. 1 stop, in the back of the 80, by four men, the month, at 50s. per fathom, worth 9½ per fathom. No. 2 ditto, by four men, the month, at 3½ per fathom, worth 8½ per fathom. No. 3 ditto, by four men, the month, at 3½ per fathom, worth about 60½ per fathom. To drive a winze west of No. 1 stop, by four men, the month, at 7½ per fathom, worth 8½ per fathom. In the cross-cut west, in this level, we have passed through a winze or lode level, 6 to 9 in. wide, of capel, quartz, mounds, &c.; for further proof we have set two men to drive 6 ft. further, at 8½ per fathom. We shall next week commence to sink No. 4 winze below this level. The 70 cross-cut to drive east, by two men, the month, at 9½ per fathom—Massey's Shaft: We have 12 men squaring down the rise and putting back stuff in the old workings. In the meantime we are preparing the timber for casing and dividing it, and hope to meet it all complete by the 40 by the latter part of next week, when no time will be lost in sinking below the well as driving on the level south in new ground. We have 22 men on tribute in the different parts of the mine, varying from 18 to 18½ per ton for No. 1 quality dressed ore, and 8½ per ton for No. 2 quality. We can only add, as usual in our report for the meeting held last week, the future prospects of the mine are good.

PANDORA.—H. Nottingham, March 28: There is no material change in the ground since the last report, the different bargains being equal to last valuation.

PALELEY.—C. Williams, March 28: The very favourable improvement continues in the 30 east, on Rake vein, and yesterday the men have cut another rib of steel grain ore on the south or hanging side of the vein, and in addition to this there are several branches of solid metal on the footwall and rise, altogether presenting an exceedingly favourable feature. The ground is becoming more speedy for progress, and letting out much water. The 30 west, on the same vein, is at the present time producing fine quality ore for 10 in. in thickness, the footwall, worth from 7½ to 8½ per fathom; the other portion of the vein is yielding stones of ore for several feet in width. The south cross-cut in the 20 west, to cut Lumb vein, is becoming very easy to work; the general appearance of the footwall of the lode at that point is expected to be a very good one, and the character of the ground lead me to believe that we are close upon the vein. I have no doubt we shall intersect it this week. The new vein behind the vein 1 of this cross-cut is from 10 to 11 ft. wide, consisting of lime-spar, gossan, &c., &c., improving; I shall put more men here next week, and trust to realise a good quantity of ore. The metal pitch in the top part of the bed, in the 23, is producing 20 cwt. of lead per fathom. The metal pitch in Fiddling's vein is worth 12½ per fathom for lead ore. The Sun vein, going east from the footwall, in the 23, is a shaft, under Gillfield's level, is yielding about 25 cwt. of lead ore per fathom, and likely to improve as we advance. We shall commence sinking next week.

PENHALLS.—S. Bennetts, P. Vian, March 24: The 70 east is looking more promising—a large lode, containing good tin stuff; the same level north has now reached the western section of the north part of the lode. The 60 east is worth 1½ per fathom. A sort of middle level cross-cut has not yet intersected the south section of the lode at that point, but it is expected to do so in the course of a few days. The cross-course in the 50 north is easy for driving without any appearance of lode as yet. The 45 west is worth 8½ per fathom. The rise in the 45 west above this level has just reached the under wall of the lode, which will be cut through in the course of a few days. The 45 west is worth 6½ per fathom.

PENNERLEY.—W. T. Harris, J. Delbridge, March 27: Engine Shaft: The lode in the 130 east is 2 ft. wide, composed of carbonate of lime, and worth 1 ton of lead ore per fathom; according to the dip of ore in the roof of the level a men probable lode should now be in this driving; the character of the lode indicates early improvement. The winze sinking below the 120 east is communicating with the rise; this has thoroughly ventilated the 120, and laid out a very profitable stopping ground, which is now being done; the lode is worth 1½ ton per fathom. The lode in No. 2 winze, sinking below this level, is 2½ ft. wide, worth 2 tons of lead ore per fathom; there is a good deal of water here, which makes it very troublesome for sinking. The cross cut to intersect Warm Water lode is making usual progress; upon the intersection of this lode we are in high expectation of discovering a profitable lode. No. 1 stop, in the bottom of the 80, is worth 2 tons per fathom. No. 2 stop 2 tons per fathom, and No. 3 stop 1½ ton lead ore per fathom. The three stops in back of this level are worth on an average 1 ton per fathom—Potter's Pit: In the 55 west the lode is producing no ore; it is undergoing a favourable change, and we are looking for an early improvement. The 45 west, on Wilson's lode, continues to yield rich stones of ore, and very promising for a productive lode. Throughout the mine there are 10 pitches at work, and the men making fair wages in their respective prices—from 8s. to 12s. per ton.

PERKINS BEACH.—S. M. Ridge, March 24: Since my last report I have suspended the sinking of Bowyer's sump below the adit level, and fixed the men in the different places to drive as previously advised. Four men are driving 70 south west towards Gwilliam's and Walker's lodes, which is a first class trial, but the ground here is strong and hard for driving, consequently we are not making such progress as I could wish. Next month I propose to increase the number of men here to six so as to push on with speed to cut the before mentioned lode, as we have good ore in Gwilliam's lode going down below the adit level. In driving upon No. 2 counter lode in the 15, I have been very happy to see it improve, and a strong feed of water bursting out from the level. I like to say in this connection it is a promising indication of something good. The No. 3 counter lode at the 15, driving north east by three men, is not looking so well as last reported, but it has had some nice lumps of lead in the driving going down below the level; the lode is, however, at present small and unproductive. The lode in the 70, driving east of the engine shaft, by four men, is at present small, and the ground strong for driving. I am pleased to inform you that we have a nice kindly lode in the level, and we have put three men to drive east upon Cross's lode, and we are looking for some nice lead ore in Gwilliam's lode. I am happy to say it is improving its lead ore as depth is obtained. During this week we have broken a nice rib of lead out of some of the blocks of lead being better than 1 cwt.

PLYNIMON.—J. Garland, March 28: In Jones's winze sinking below the east of new shaft, fair progress is being made; we have not as yet met with the lode, but now expect to daily; this winze is now down 2 fms. 4 ft. the ground is a little easier for sinking. In Herbert's winze sinking below the same level the branch mentioned in a previous report has improved, and now produces full ton of lead ore per fathom; judging by its dip to-day I believe this will be a strong drop into the main lode. The 100 east, by three men, is still driving south; this winze is down about 2 fms. 5 ft. The slope over the 24, east of cross-cut, produces fully 1½ ton of lead ore per fathom. In the slope over this level, east of last named, not much has been done during the past week; this slope averages a produce of ½ ton of lead ore per fathom, and should shortly considerably improve. The loading under pendulum bol has been completed, and the sweep connected thereto; I hope to have everything connected with this new work completed in another week ready for resuming the sinking of the new shaft. The west stop, in back of the 15, 23½, per fathom, worth 26 cwt. of ore per fathom, and dressing to be kept on with regularity. The machinery throughout is in fair working order, with a good supply of water.

PRINCE OF WALES.—J. Andrews, March 28: Setting Report: To drive the 77 end, west of cross-course, by six men, at 8½ per fathom; lode 2 ft. wide, yielding mounds and good stones of copper ore. To drive the 55 west, by six men, at 6½ per fathom; lode 4 ft. wide, of quartz, capel, and mounds, and yields a little copper ore, but not enough to value. To stop the back of the 55, west of cross-course, by six men, at 6½ per fathom; lode 2½ ft. wide, worth 16½ per fathom. A pitch in back of the 55, west of lode, is worth 14½ per fathom. In the 45 west, by two men in each pitch, at 11½ and 12½ in. respectively.

RED ROCK (Lead).—John Kitto, March 23: We have completed the lode at the 60, and the shaftmen are now engaged putting in penthouse, and will resume the sinking of the shaft in a day or two. The 60, west of the engine-shaft, has so far opened out very satisfactory, and at the point where we have cross cut the lode we have intersected a very good branch of ore about 18 in. in width. The end of the level is now about 15 fms. in advance of this cross-cut westward, and during the past week I shall have another cross-cut put out north, to prove the lode near the present forebore. We have had much since to draw from the lode and the levels westward that we have not been able to resume the driving of the 60 east, but now the lode is finished this will be done immediately. I have nothing new to report from any other part.

ROMAN GRAVELS.—A. Waters, March 28: The 106, south of flat road shaft, is opening out a strong productive lode and profitable ground. The same remarks apply to the 106, north of the shaft. The winze 8 fms. north of shaft, below the 95, is also worth 3 tons per fathom. The new south engine shaft below the 85, is producing regularity, and will be deep enough for the next level in 2 fms. further sinking. The 15, north of shaft, is worth 1 ton per fathom. The 50 south is worth 3½ tons per fathom. The winze sinking below the 65, south of Stokes, is worth 3 tons per fathom. Other points as last reported.

ROOKHOPE.—J. Blenkins, March 28: I visited the above mines on Monday last, when contracts were set as follows: Seven men rising from the 42 to the 60 Gin shaft, at 60s. per fathom (company tramming shaft). Six men making track past Gin

1. The first part of the paper is devoted to the study of the asymptotic behavior of the solutions of the system (1) as $\epsilon \rightarrow 0$. It is shown that the solutions of the system (1) converge to the solutions of the system (2) in the sense of the weak convergence in the space $L^2(\Omega; \mathbb{R}^n)$.

BLACK TIN.								
Date.	Mines.	Tons c.	q.	lb.	Price per ton.	Amount.	Purchasers.	
March 21-	Wheal Coates	4	10	1	10	£43 2 6	£194 15 10	-Daubuz.

A petition has been presented to the High Court of Justice for the winding up of the North of Iceland Sulphur Company (Limited).
 Vice-Chancellor Sir James Baron has appointed Mr. J. J. Saffery (Messrs. J. J. Saffery and Co.) official liquidator of the Ottoman Company.
 The Master of the Rolls has appointed Mr. Alfred A. Broad (Broads, Paterson, and May, accountants, Watbrook), and Mr. Lewis (one of the directors) official liquidators of Hooper's Telegraph Works (Limited).
 The Bury Port Smelting Company, consisting of four partners—Attley Thompson, Douglas A. Gossow, Charles H. Woods, and John D. Thompson—has filed a petition for liquidation in the County Court of Carmarthen. It is believed that the petition will prove to be considerable, and the failure affects several mining concerns rather seriously. The difficulties of the company have been known for some little time, and efforts were made to tide them over, but they have proved unsuccessful.
 Mr. Clemenow, of the Birmingham, Dudley, and District Banking Company, has been appointed manager of the North West Bank, Liverpool.
THARIS SULPHUR AND COPPER COMPANY.—The directors have resolved to recommend at the annual meeting, to be held on April 19, that a divi-

A MONGST the DIVIDEND-PAYING MINES of CORNWALL, the SPECIAL ATTENTION of INVESTORS is MERITED by HOLMBUSH, which is now making returns of 30 per cent. per annum, with extensive reserves already accumulated, and excellent prospects of further rich discoveries. The present price of the £1 shares is 27s. 6d. Orders to purchase will be executed by Mr. S. EDOE, 150, Palmerston Buildings, Bishopsgate-str. et, London, E.C., from whom a descriptive pamphlet may be obtained free of charge.

BLACK TIN.						
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confirming the fact that silicon in iron and steel improves the soundness of the casting, and in reasonable quantities does not materially diminish the strength. Mr. RILEY's observations on the determination of manganese in spiegeleisen and in iron ores are well worthy of consideration, more especially from the importance to the metallurgist of knowing not only how much of a given ingredient he is using, but also of being sure that he is not unintentionally prejudicing his results by introducing impurities whose very existence he is unaware of. In the course of the meeting some interesting remarks were made upon the principles which ensured good welding; this appeared to be the production of such a flux as shall readily squeezed out in making the weld, the object being to avoid the retention of the oxide of iron formed by the heat. That absolute retention of the clean surfaces of metal is sufficient to ensure a good contact was proved by filing the surfaces of two pieces to be welded, binding them with wire, luting, heating, and hammering—the weld was invisible. Mr. BELL's paper on the separation of carbon, phosphorus, silicon, and sulphur from iron was invaluable. He showed amongst other things that if the carbon be removed too rapidly the iron comes to nature before the other impurities can be got rid of, and a hard unsatisfactory iron is the result. He had also found it best to melt the iron before introducing it into the puddling furnace, as the iron was better, and only one-half of the phosphorus remained in the iron. In the same metal melted cold there remained 0.328 of phosphorus, and melted hot 0.209. In melting the silicon is removed first, then the phosphorus, and last the carbon, and at the end of the process care is necessary to prevent the iron re-taking phosphorus from the slag. The conclusion of the meeting is reported in to-day's Journal, and to this reference for details must be made.

THE COPPER TRADE.

During the quarter ending March 31 the quantity of copper ore, the produce of Cornwall and Devonshire, sold at the Cornish Ticketing, was 13,407 tons, which contained 898 tons 14 cwt. fine copper, and realised 56,354 9s., being equal to an average of 41.4s. 1d. per ton of ore, and 62 1/2s. per ton of copper in the ore. During the same period the British, colonial, and foreign ores sold at Swansea amounted to 10,191 tons, which contained 1513 tons 1 cwt. of fine copper, and realised 109,890 7s., being equal to an average of 106 1/2s. 8d. per ton of ore, and 72 1/2s. 6d. per ton of copper in the ore. The average produce of the ore sold at the Cornish Ticketings was 6 1/2-16 per cent., whilst that sold at Swansea gave an average produce of 14 1/2-16 per cent. From this it will be seen that the aggregate sales by ticket were 23,598 tons of ore, containing 2411 tons 15 cwt. of fine copper, and realising 166,244 16s. The subjoined is a summary of the periodical sales at the Cornish and Swansea Ticketings respectively. The ores sold at the Cornish Ticketings were—

Date.	Standard.	Prod.	Price.	Per unit.	Tons.	Fine cop.	Amount.
Jan. 4.	£103 0 0	7	£4 9 0	12s. 8½d.	1439	90t. 10c.	£ 6,333 18 0
18.	104 19 0	6½	4 1 6	12 5½	3099	241 8.	15,061 5 6
Feb. 1.	99 19 0	7½	5 2 6	13 0	1224	95 9.	6,272 18 6
22.	104 2 0	6½	3 19 0	12 6	2094	169 17.	10,609 6 0
Mar. 8.	101 9 0	6½	4 5 0	12 4	1336	92 6.	5,492 18 6
22.	103 19 0	6½	4 2 0	12 5	3025	199 4.	12,384 2 6
Total for the quarter					13,407	898 14.	£56,354 9 0
Quarter ending December, 1876					14,120	943 9.	61,079 0 6
Quarter ending September, 1876					14,075	933 14.	65,879 5 6
Quarter ending June, 1876					14,726	951 4.	65,637 1 0
Total for the year 1876					56,328	3,737	1,224,949 16 0
Showing a quarterly average of					14,082	934 5.	62,237 9 0
Corresponding quarter March, 1876					15,094	1,002 16.	71,543 0 0

The ores sold at the Swansea Ticketings were—

Date.	Standard.	Prod.	Price.	Per unit.	Tons.	Fine cop.	Amount.				
Jan. 2.	2 255 9 8	10 1/2	£12 0 8	11s. 8d.	1722	282t. 0c.	£20,720 18 6				
15.	95 16 4	13 1/2	10 1 1	14 7 1/2	1385	187	14	13,728 2 0			
29.	95 7 4	11 1/2	8 10 6	14 6	2014	235 8	17,168 18 0				
Feb. 13.	95 18 4	14 13 1/2	10 17 10	14 8	2064	305 15	22,486 15 0				
27.	95 0 6	11 1/2	8 4 9	14 5	1383	155 1	11,232 17 6				
Mar. 13.	91 15 0	20 1/2	14 15 2	14 1 1/2	1638	847 3	24,544 16 0				
Total for the quarter								10,191	1513	1	£109,890 7 0
Quarter ending December, 1876								9,779	1375	2	102,068 10 6
Quarter ending September, 1876								11,867	1699	5	117,734 3 0
Quarter ending June, 1876								8,227	1698	10	132,534 10 0
Total for the year 1876								40,064	6195	18	£462,219 10 6
Showing a quarterly average of								10,016	1548	19	115,554 17 8
Corresponding quarter, March, 1876.								4,383	989	4	79,768 10 6

RAILWAY IRON IN AUSTRALASIA.

The intelligence received from the Australasian colonies continue to indicate a large measure of commercial activity, and railways are advancing apace in our antipodean settlements. In the midst of the general depression, it is both encouraging and satisfactory to find that we sent the Australian colonies 6770 tons of railway iron in the first two months of this year, as compared with 6043 tons in the corresponding period of 1876, although the shipments attained the still larger total of 13,439 tons in the corresponding period of 1875. That the Australian demand for our railway material is likely to continue liberal may be inferred from the fact that the single colony of Queensland, with a population of under 180,000, and a territory of 678,000 square miles, has now 293 miles of line open for traffic and 162 miles more under construction, besides which it is proposed to construct other new lines to the extent of about 250 miles more, although these extensions have not been finally approved by the Queensland Parliament. The energy which Queensland is displaying in the work of railway construction is, perhaps, rendered all the more remarkable by the fact that thus far the Queensland railways have not been worked with particularly remunerative results. In 1875, for instance, the Queensland railways carried only 137,890 passengers and 50,785 tons of goods, while in South Australia, a colony which has not a much larger population than Queensland, the number of passengers carried by the Government lines in the same year was 1,039,241, the goods movement amounting to 591,549 tons, or nearly 1 1/2 tons per annum of the whole population. But the Queensland authorities see that railways confer indirect benefits upon a colony, even if they are not attended with immediately remunerative results. Similarly sound ideas prevail in the other Australasian colonies, and hence the remarkable vigour with which Australasian railways are now being pushed forward.

As we have before remarked, the work of Australasian colonisation is now advancing with gigantic strides. It was in 1877 that the first Australasian colony—New South Wales—was founded; but it was not until 1824 that the discovery of the value of Merino wool really elevated New South Wales from the degradation inherent in a penal settlement to the dignity associated with a British colony. The establishment of further colonies at the Antipodes—Western Australia in 1829, South Australia in 1836, Victoria and New Zealand shortly after 1840—are all events within the memory of many still living. The astonishing gold discoveries of 1851 really laid the foundations of the Australasian colonies, as they added materially to their wealth and population; and as the pastoral interest of the Australasia has attained an astonishing importance, capital is not now lacking at the Antipodes, and on all sides the Australians are bringing pressure to bear upon their Governments to induce them to undertake the construction of more railways. The progress of New Zealand has been especially rapid during the last 20 years. In 1855 that colony had a population of only 37,192, but in 1860 it had grown to 79,711, in 1865 to 190,607, in 1870 to 248,400, and in 1875 to 375,856. The rate of increase in the first 10 years was not so large as in the second decade, and probably New Zealand will have 1,000,000 inhabitants by 1885. It is wool which has had the largest share in promoting the wonderful progress observable in the material development of New Zealand. Thus in 1855 New Zealand exported only 1,772,344 lbs. of wool, while in 1865 the corresponding exports had risen to 19,180,500 lbs., and in 1875 to 54,401,540 lbs.

It is not surprising, then, to find that New Zealand, in common with the other members of the Antipodean group of settlements, has completed some railways, and has planned out a large additional network. The extent of New Zealand railways in operation in 1873 was 145 miles; in 1874, 209 miles; and in 1875, 542 miles. At the close of 1875 there were also 464 miles more line in course of construction in the Britain of the South.

NATIONAL BOILER INSURANCE COMPANY.—The chief engineer's report for 1876 contains a large amount of information of interest to users of steam. Despite the depression of trade, the number of boilers insured and under inspection has increased, and no inspected boiler has exploded. The most desirable method of setting boilers is described and illustrated, and the system of coating patented by Stone's Boiler Coating Company is advocated. During 1876 there happened 40 steam-boiler explosions which were brought to the chief engineer's knowledge, which is considerably below the average, but the loss of life was unusually large.

MINING IN NEW ZEALAND AND AUSTRALIA.—Amongst the companies registered during the past week is one formed under the title of the Ravenscliff Mining Company (Limited), for the purpose of acquiring some gold mining properties in New Zealand, and a copper property in South Australia. The Memorandum of Association is signed by gentlemen concerned in the direction and management of some of the most successful Australian companies, and whose names are generally looked upon as a guarantee of the bona fides of any undertaking with which they may connect themselves. We understand that the prospectus is to be issued early next week, and have no doubt that the capital of 60,000l. will be speedily subscribed in the present dearth of trustworthy channels for the investment of the large amounts of money now lying idle.

COAL AND IRON IN THE UNITED STATES.—The production of coal in Pennsylvania thus far this year exhibits some increase, as compared with the corresponding period of 1876. The pig-iron trade has not presented any improvement at Philadelphia, and the market is in an unsettled condition. Purchases are made to meet immediate requirements only. Some of the companies state that they are resolved to put their furnaces out of blast rather than to submit to a further reduction in prices. No sales of importance have taken place at Philadelphia in the steel rail market; prices have, however, been firm; \$50 per ton at the mills is the general quotation. Sales of lots of a few hundred tons each are reported almost daily, but buyers of large quantities await concessions. There has been little change to report in iron rails at Philadelphia; business has been quiet, upon the whole; and although some orders are on the market, nothing of importance has been carried through. Some improvement has been noted in the demand for sheet-iron at Philadelphia, although the season has not fully opened. There has been no special change in bar-iron at Philadelphia; the demand has slightly improved, and all the mills have been doing a little more business. The market for all the leading sizes of steel has continued active at Pittsburgh; manufacturers are generally busy, and some of them are unable to keep up with their orders. A decidedly firmer feeling has been noticed at Pittsburgh as regards manufactured iron.

REPORT FROM CORNWALL.

March 29.—This is not a season when one anticipates much liveliness, whether in mining or any other matters of business. Easter always makes that which is lively dull—save in the holiday direction—and that which is dull already duller still. And 1877 is certainly no exception to the rule. It is, in fact, more than could reasonably have been anticipated to learn authoritatively that the hopes entertained of the working of the Great Perran iron lode are really in a fair way of being realised. Mr. Roebuck has never ceased his efforts to develop the mineral wealth of this important district, and though time after time his efforts have seemed doomed to disappointment he has never ceased to strive, having never ceased to retain his faith in the prospects of the locality and in the value of its mineral deposits. It is understood that the gentlemen who are now associated with the undertaking are not only wealthy but thoroughly practical, and the strongest hopes are entertained that even under present conditions a handsome profit will be realised. The management will be in excellent hands.

New Consols appears to be tiding over its difficulties, and we may hope that within a month it will be placed upon a foundation of assured prosperity. In fact, great though the difficulties may have been, the affairs of the mine have now arrived at such a point, and the gigantic experiment made has proved such a practical success, that the men of business and wealth who have hitherto had the mine in hand would be thoroughly stultifying themselves if they ceased to give the undertaking their earnest support now that the crucial point has been reached. We trust that before the formal petition again comes on for hearing all will be satisfactorily arranged. Now is the time for all who are interested to pull heartily together.

Few questions of greater practical importance could have been brought before the Mining Institute than that which has occupied the attention of the members this week. The importance of improving the economy and efficiency of stamping arrangements is acknowledged on all hands—in fact, it is every whit as important as any point connected with the dressing of tin. Mr. John Hocking, jun., therefore, deserves the thanks of the mining community for having taken up the subject in so thoroughly practical a spirit. It does not follow that we should agree to all his conclusions. Mr. Hocking holds that the present best form of stamps is the improved gravitation stamps, as illustrated by the new stamps at West Basset, which are driven by a Cornish boiler fitted on the Galloway cone tube principle. The stamps were stated by Mr. Hocking to be stamping at the rate of 61 3/4 lbs. of tin for each ton of tin stuff, whereas the old stamps used 109 lbs. of coal. Hence the saving is 40 per cent., a very substantial gain indeed, and which shows what the old stamps are capable of. We thoroughly agree with Mr. Hocking on the importance of the extended use of the stone-breaker. He does not look for any particular saving in the breaking by machinery as compared with hand labour, though surely experience points the other way, but he does hold that the stuff when prepared by the breaker is in so much better condition for stamping that the consumption of coal would be reduced to 50 lbs. a ton, or even less. The gravitation stamps did not have it all their own way by any means. Mr. Cox gave the experience of pneumatic stamping at Park-of-Mines to be the consumption of 40 lbs. per ton. But the most important remarks under this head came from Mr. Husband, Capt. Harris, and Mr. Eustace. Mr. Husband starting with stamp heads of 120 lbs. in weight has now got to heads weighing 820 lbs., and as the larger the head the less the proportionate expense of stamping, he sees no reason why in time the heads should not be brought up to a ton. There has been ample evidence afforded that the pneumatic stamps, compared with the work they do, are not costly. Capt. Harris stated that 550l. would put up three heads that could crush 20 tons of stuff per day of 10 hours, and the cost of maintenance is really less than that of the old-fashioned plan. It is in this direction we are convinced that the stamp of the future must be sought. Gravitation was all very well when the stamps were worked by water only, but with a costly motor we want not only weight but power.

Man-engines are singularly free from causing accidents, but a fatal one happened last week at Tincroft to a miner named Hocking. At the inquest Henry Ivey said he was ascending to surface on the man-engine at Tincroft Mine on Friday last, and the deceased was one step above him, when, on going from the 160 to the 120, he looked up and saw the deceased holding the handle, and his body swinging over on one side. Witness at once shouted out to the other men to "ring, and hold fast," and several of the men laid hold of the knocker line, which was close by the engine-rod, and rang, but the deceased in the meantime got his head jammed against the collar. How deceased got into the position described witness could not tell. Alfred Hocking said he was going to surface two steps below the deceased, and heard Ivey shout "Ring, and hold fast," and he laid hold of the

knocker line and helped to ring. The engine did not go a stroke after the men rang. At the 120 the deceased fell off on the collar. When he got to him deceased was insensible, and could give no explanation of how he got into the position he was in. The man-engine was in good working order. The deceased was carrying nothing in his hands, and there was no apparent reason why he missed his footing. Dr. Le Neve Foster, the Government Inspector, said he had seen the place where the accident occurred, and could find no fault, except that the toe-step was off. Capt. Martin informed him that the deceased stated that when he was on the step he was seized with a "rambling" in his head. A verdict of "Accidental Death" was returned.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

March 28.—Neither high, medium, nor low class finished iron is in so much demand this week as it was at the date of my last. The works have been going to the utmost extent that the orders would permit to get all specifications out of hand before the close of the week, when the Easter holidays will begin. Prices are being quoted in favour of the market by masters who wish to have some work for their men when the holidays are over. It is necessary to quote prices at which no profit can be got if any work is to be had, yet the disposition to quote such rates is slightly more apparent now than a week ago, notwithstanding the laying off of mills. Pig-iron is being produced in larger quantities than either the foundries or finished ironworks can take it, and there is, therefore, a steady accumulation of stock. For Staffordshire makes the quotations are without much change. A slight weakness is noticeable in minimum quantities for forge uses, but foundry iron is proportionately stronger. Fewer furnaces by two are in blast at Tipton than at the date of my last, because of the failure of Messrs. W. and E. Onions, of the Park Lane Furnaces. Quite as much has been done in the week at the collieries, but there is reason to conclude that after Easter the prevailing quietude will be more marked. Some colliery owners are hoping that terms will be practicable for increasing the stint before the expiration of the six months within which no change in wages can be made under the terms of the arbitration agreement. But by the Union the men are being encouraged to resist any such arrangement.

The Warwickshire Mineowners' Association have given their men notice for a drop of 10 per cent., and invite them to a conference to discuss the matter. The men are about holding a meeting to decide what course they shall pursue.

Little movement is manifest in the local share market as regards the property of coal and iron concerns. The 20l. fully paid shares of the Alldridge Colliery sold since my last at 7 1/2 premium; buyers are offering 20l. for the 10l. fully paid shares of the Sandwell Park Colliery; holders of West Cannock Colliery shares are willing to part with them at 5 and 2 1/2 discount respectively, and 2l. discount will still secure the 20l. (4l. paid) shares of the Cannock and Huntington, and the 20l. (12l. paid) shares of the Hamstead Colliery. The 5 per cent. preference shares of the Patent Shaft and Axletree Company have changed hands at 10l. 5s.; and the 10l. shares of Messrs. J. Bagnall and Sons at 3l. 10s. Encouraged, no doubt, by the late favourable report, buyers are offering 15l. for the 10l. shares of the Muntz Metal Company, but there are no sellers.

A movement is going on in the nut and bolt trade by which the masters hope to gain some slight reduction in wages to help them to contend against the present bad trade. A conference between representative masters and men has been held in consequence of the masters having resolved to reduce the price agreed in 1872 to be paid, and the men have consented to receive a revised list of prices for consideration. It is, however, unlikely that the men will submit to any reduction, at any rate not without a struggle.

The Safe Trade is generally improving, and manufacturers who have reduced their prices this year are not much in want of orders. A safe of no mean pretensions has just been dispatched from this district to Battle Abbey direct, to the order of the Duchess of Cleveland. Her Grace designs it for the custody of her jewels, the recent robbery from Battle Abbey having led to the purchase. The safe is 2 ft. 9 in. high, and over 2 ft. deep and wide, is drill, wedge, and fire proof, and cannot be picked. After her grace's own design, it has been fitted up by the maker (Mr. George Price, Cleveland Works, Wolverhampton) with five drawers, in which the jewel cases will be stored. The body plates are 3/4 to 1 in. thick; the door, 1 in., is case-hardened, by which it is proof against the drill, and the wedge is made harmless by the formidable rings of boiler-plate iron which are shrunk on around the front and back.

In North Staffordshire a revival in the pottery trade has benefited the coal industry, still not half the coal is being mined that could be brought up. Domestic coal ranges from 10s. to 12s. 6d. at the pits. The quantity of ironstone sent out of the district is falling off. Pig-iron is without improvement, prices are weak, and sales not large or frequent. Most of the finished ironworks are able to make 8 and here and there 10 turns per week, but new orders are difficult to get in most departments.

REPORT FROM THE NORTH OF ENGLAND.

March 28.—The state of the Durham Coal Trade continues so depressed that the owners have been compelled to demand further reductions of wages from cokemen and enginemens employed about the collieries. These reductions are now under consideration, and whether they will be submitted, as others have been heretofore, to arbitration, or whether they will be awarded subject to the provisions of the sliding scale that is now applied to the wages of underground workmen, remains to be seen. The next few days will see a considerable progress in the negotiations between the different associations. It can hardly be said that there is any change to report in the position of affairs in Northumberland. Dullness is as rampant as ever, and production in several quarters is being curtailed. At the New Delaval Colliery the working gear was brought to bank on Friday last on the termination of the notices issued to the miners a fortnight ago, but it is understood that work will be found for the great majority of the men thus thrown idle at the Old Delaval Colliery, which is to be set going again after repairs and alterations. It is also proposed to resume operations at the Hartford Daisy Pit, where extensive alterations have been in progress for the past two or three weeks.

The failure is announced of Mr. Thomas Greener, coal and coke merchant, Darlington. The liabilities are not quite known, but it is believed they will be close on 50,000l.

At the Tudhoe Ironworks the puddlers have struck work in consequence of an alteration made by the owners in the process of bleeding the iron, which is said to make the iron more difficult for the men to work. A strike is apprehended among the men employed in the shipbuilding trade of the Tees, who have been refused the 10 per cent. advance asked for a few days ago. It will be definitely known on Saturday what the men really mean to do. At Hartlepool the shipwrights asked for an advance of 10 per cent., and Messrs. Gray and Co. have agreed to concede in the meantime an increase of 5 per cent. on certain kinds of work.

The condition of the Cleveland Iron Trade does not inspire much satisfaction with the present nor hope in the future. It is really getting worse from day to day, and do what they will makers cannot prevent prices from following the law of commercial gravitation. On Tuesday there was practically no business done on Change at Middlesbrough. Prices were quoted at about the same range as that of the previous week, No. 3 being offered as low as 41s. per ton, while No. 4 forge could be bought for 39s., cash on delivery. These are the lowest prices touched for a number of years, and it puzzles a good many to understand how merchants and makers can sell at such figures without entering the Bankruptcy Court. The fact is all the more curious when considered along with the very large production of pig-iron now going on in the district. It is estimated that the make for March will be quite equal to that of any month for the last year at any rate, and the actual requirements of the pig-iron makers in the way of raw materials may be gauged by the circumstance that the mineral traffic returns of the North-Eastern Railway for last week are 219 1/2 in excess of the receipts for the corresponding week

சென்னை, 26 சூன் 2019

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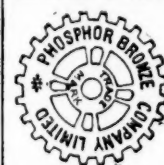
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100	Ashbury Co. [L.]	8	0.00
10	Bagnall, John, and Sons [L.]	90	0.00
10	Benhar Coal Co. [L.]	10	0.00
60	Bilbao Iron Ore Co. [L.]	60	0.00
10	Bilston & Crump Meadow Coll. Co. [L.]	110	0.00
50	Blaen Cwmbach Coal Co. [L.]	4	0.00
50	Blaenwron Iron and Steel Co. [L.]	4	0.00
100	Bolelaw, John, and Co. [L.]	45	0.00
50	Bowling Iron Co. [L.]	50	0.00
50	Britannia Ironworks [L.]	25	0.00
50	Brown, Bailey, and Dixon [L.]	70	0.00
100	Brown, John, and Co. [L.]	70	0.00
6	Cakemore Colliery Co. [L.]	5	0.00
100	Cammell and Co. [L.]	80	0.00
20	Cannock and Huntington Coal [L.]	4	0.00
10	Cardiff & Swansea St. Coal Co. [L.]	8	0.00
10	Cardigan Steel Wire Co. [L.]	8	0.00
10	Central Swedish Iron and Steel [L.]	10	0.00
6	Chapel House Colliery	5	0.00
50	Charlton Iron Co. [L.]	50	0.00
50	Chatterley Iron Co. [L.]	45	0.00
10	Chillingham Iron Co. [L.]	10	0.00
1	Clee Hill Colliery Co. [L.]	1	0.00
1	Cannett Iron Co. [L.]	7	10.00
1	Consett & Sharncliffe Iron Co. [L.]	1	0.00
50	Cooke, William, and Co. [L.]	40	0.00
20	Darlington Iron Co. [L.]	10	0.00
50	Davy Brothers [L.]	22	10.00
5	Diamond Fuel Co. [L.]	29	0.00
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100	Fox, Samuel, and Co. [L.]	9	0.00
10	General Mining Ass. [L.] (2 returned)	17	0.00
20	Great Western Coal Co. [L.]	2	0.00
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5	Littleddon Woodside Coll. Co. [L.]	50	0.00
50	Llynvi, Ogmore, & Tendu Co. [L.]	8	0.00
10	Lydney and Wipool Iron Ore [L.]	10	0.00
10	Marbella Iron Ore Co. [L.]	5	0.00
10	Maryland Steel and Iron Co. [L.]	5	0.00
10	Midland Iron Co. [L.]	5	0.00
6	Mold Argued Colliery [L.]	5	0.00
10	Munkland Iron and Coal Co. [L.]	9	0.00
4	Mynydd Iron Ore [L.]	10	0.00
100	Nant-y-glo and Blaiana (8 p.c. pref.)	100	0.00
1	Nerbudda Coal and Iron	0	0.00
20	New Sharlston Collieries [L.] Pref.	20	0.00
10	Newport Abercrom Coal Co. [L.]	10	0.00
10	Northampton Coal, Iron & Wagon [L.]	8	0.00
10	Northfield Iron Co. [L.]	8	0.00
1	Norton Green Coal Co. [L.]	8	0.00
35	Palmer's Shipbuilding and Iron [L.]	25	0.00
00	Parkgate Iron Co. [L.]	65	0.00
20	Patent Nut and Bolt Co. [L.]	14	0.00
20	Patent Shaft and Axletree [L.]	10	0.00
20	Pelsall Coal and Iron [L.]	15	0.00
00	Phoenix Bessemer Co. [L.]	40	0.00
50	Rhymney Iron Co. [L.]	50	0.00
10	Richards and Co. [L.]	10	0.00
10	Sandwell Park Colliery Co. [L.]	100	0.00
50	Ditto New	100	0.00
10	Rhotts Iron Co. [L.]	107	0.00
50	Rhebridge Iron and Coal [L.]	65	0.00
50	Silkstone & Dodworth Cl. & Iron [L.]	27	0.00
20	Skerne Ironworks [L.]	20	0.00
50	Somerset Iron Co. [L.]	50	0.00
20	South Wales Coal Co. [L.]	17	0.00
10	Staveley Iron and Coal Co. [L.]	80	0.00
50	Ditto New	10	0.00
20	South Cleveland Ironworks [L.]	20	0.00
10	Rwansea Valley Steam Coll. Co. [L.]	100	0.00
100	Thames Iron Company	12	0.00
25	Tredegar Iron and Coal Co. [L.]	25	0.00
20	Ditto B. shares	12	0.00
1	Ulverston Mining Co. [L.]	1	0.00
1	United Bituminous Collieries [L.]	6	0.00
10	Vancouver Coal [L.]	100	0.00
100	Vickers, Sons, & Co. [L.]	50	0.00
50	Welsh Ironworks Co. [L.]	20	0.00
25	W. Cumberland I. and Steel [L.]	5	0.00
10	West Montyuan Coal [L.] (12 p.c. pref.)	10	0.00
5	West Swansea Colliery Co. [L.]	10	0.00
10	Whitehaven Iron Co. [L.]	70	0.00
100	Wigan and Whiston Coal Co. [L.]	75	0.00
100	Wigan Coal and Iron Co. [L.]	75	0.00

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WAGON COMPANIES.			
10	Birmingham Wagon Co. [L.].....	10	0 00. 22 5/8
10	Ditto, 2nd issue	4	0 00. 5
10	Ditto, pref., 6 per cent.	10	0 00. 12 1/2
20	British Wagon Co. [L.].....	10	0 00. 2 1/2
10	Glooucester [L.]	10	0 00. 1 1/2
10	Ditto, 5th issue	5	0 00. 1 1/2
10	Mt. Rail. Car. and Wagon Co. [L.]...	5	0 00. 4 1/2
5	Ditto, pref., 6 per cent.	5	0 00. 5 1/2
50	Midland	50	0 00. 98
20	North Central Wagon Co.	20	0 00. 27 1/2
5	Mt. Rail. Car. [L.]	5	0 00. 10 1/2
5	Ditto, pref., 6 per cent.	5	0 00. 5
20	Rheffield Wagon Co. [L.].....	15	0 00. 3 1/2
10	Yorkshire Wagon Co. [L.].....	10	0 00. 4 1/2
TELEGRAPH COMPANIES.			
"St."	Anglo-American	100	0 00. 59
10	Brazilian Submarine	10	0 00. 6 1/2
20	British United States Cable	20	0 00. 12 1/2
10	Eastern	10	0 00. 7 1/2
10	East. Exten., Australia and China.....	10	0 00. 7 1/2
10	Great Northern	10	0 00. 7 1/2
25	Indo-European	25	0 00. 20 1/2
10	Mediterranean Extension	10	0 00. 2 1/2
8	Reuters	8	0 00. 12 1/2
Stk.	Submarine	100	0 00. 2 1/2
20	West India and Panama	20	0 00. 3 1/2
20	Western and Brazilian	20	0 00. 3 1/2
\$1000	Western Union, 7 per cent. Mort. Bonds	\$1000	100 00. 10 1/2

MISCELLANEOUS.

MISCELLANEOUS.			
Stk. Atlantic and Great Western Leased Lines, Rental Trust	100	0 0..	88
25 Austral. Mort. Loan and Finance [L.]	8	0 0..	4
25 Austral. Agricultural	21	0 0..	4
10 Avsoidal Engine [L.]	7	0 0..	4
Stk. Baltimore and Ohio, 6 per cent.	100	0 0..	109
Stk. Cent. of New Jersey Con. Mort.	100	0 0..	81
Stk. Cent. Pacific of Calif., 1st Mort. 6 p.c.	100	0 0..	100 1/2
23 City of London Real Property [L.]	12	0 0..	8
25 Copper Miners of Eng. (7 p.c. pref.) ..	26	0 0..	0
15 E. of Scotland and [L.]	10	0 0..	10
5 Diamond Rock Boring	4	10 0..	1 1/2
15 English and Foreign Credit	8	0 0..	0
16 Fore Street Warehouse [L.]	14	0 0..	14 1/2
15 Foster, Porter, and Co. [L.]	10	10 0..	11
6 Gen. Phos. & Chem. Works Co. [L.] ..	8	0 0..	0
1 Glaisdale Whinstone Quarry	1	0 0..	0
17 London & B. of America	17	0 0..	13 1/2
17 Huntington Copper and Co.	100	0 0..	9 1/2
Stk. Illinois Cent., \$100 shares	100	0 0..	43
Stk. Illinois & St. Louis Bridge, 1st Mort.	100	0 0..	96
Stk. Ditto, 2nd Mort., 7 per cent.	100	0 0..	18
Stk. Illinois Cent. Sinking Fund, 5 p. cent.	100	0 0..	89
Stk. Ditto, 6 per cent.	100	0 0..	101
7 1/2 Imper. Credit [L.]	7	10 0..	7 1/2
Stk. Lehigh Val. Con. Mort., A, 6 p. cent.	100	0 0..	96
10 Miner's Safe [L.]	10	0 0..	9 1/2
25 National Discount [L.]	5	0 0..	10
Stk. N. Cent. Rail. Con. Mort., 6 per cent.	10	0 0..	83
6 Patent Gunpowder Company	0	0 0..	4 1/2
10 Pawson and Co. [L.]	50	0 0..	6
Stk. Pennell Gen. Mort. 6 p. cent.	100	0 0..	103 1/2
Stk. Ditto, Con. Sink. Fund, 6 p. ct., 1905	100	0 0..	90 1/2
Stk. Scottish Aust. Investment Company.	100	0 0..	180
Stk. Ditto, 6 per cent. Preference	100	0 0..	121
10 Silber Light (ord. sh.)	10	0 0..	0
5 Ruez Canal shares	26	0 0..	0
12 Telegraph and Cable Mainte. [L.] ..	12	0 0..	8 1/2
10 Third Second Bonus Trust, 5 p. cent.	10	0 0..	9 1/2
10 Tharvis Sulphur and Copper Co.	10	0 0..	22
Stk. Union Pacific Land Grant, 1st Mort.	100	0 0..	97
Stk. Union Pacific Railway, 1st Mort.	100	0 0..	104 1/2

* Limited Liability Companies: † quoted on the Stock Exchange; ‡ have paid dividends.

2501	Wheat Nevear, <i>a, c, s, f</i> , Callington	1	74	0 0	23 1/2	2 29 1/2
400	Wheat Pevor, <i>t, R</i> , <i>ro</i>	6	76	0 0	43 1/2	4 43 1/2
1290	Wheat Pevor, <i>c, R</i> , <i>ta</i>	2	0	6	43 1/2	3 36
400	Wheat Pevor, <i>t, c, R</i> , <i>ro</i>	13	6	0	2	1 1/2
450	White Cliff, <i>a, f</i> , Llanrwst	4	0	0	4	1 1/2

s, bisse; c, coal; c, copper; g, gold; i, lead; s, silver; si, slate;
 s-i, silver-lead; t, tin; z, zinc.

* Limited Liability Companies; † quoted on the Stock Exchange.

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